FM 44-18-1

HEADQUARTERS
DEPARTMENT OF THE ARMY



STINGER
TEAM OPERATIONS

Field Manual
No. 44-18-1

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 20 October 1980

STINGER
TEAM OPERATIONS

PREFACE

The purpose of this manual is to provide guidance on how to fight as a Stinger team in support of air defense operations. It is also written to support the training of individuals to function as members of a Stinger team.

When skilled individuals are molded into efficient, smooth functioning teams, their capability to accomplish assigned missions is greatly increased. The effectiveness of Stinger varies directly with the individual skills of each team member and the collective proficiency of each team. The key to both is training.

This manual focuses on the techniques and procedures used by the Stinger team to engage and destroy hostile targets.

FM 44-18-1 Consists of two parts:

PART I describes the Stinger system and tells how to use the weapon to shoot down aircraft. This part also describes how the team operates in combat.

PART II discusses the means and methods of training soldiers to operate the system.

This manual should be used with the system technical manual (TM 9-1425-429-12) which tells how the system functions and how to maintain it. Information found in the technical manual, such as that on maintenance and emergency destruction procedures, is not repeated in this manual.

This is a companion manual to FM 44-18, which tells how Stinger will be employed at the platoon and section level, along with other air defense artillery weapons as an integral part of the combined arms team.

The tactical doctrine and procedures contained in FM 44-18-1 will be of no use if the Stinger teams cannot effectively engage enemy aircraft. It does little good to have the Stinger team properly positioned unless the team chief and the gunner, working together, can engage and kill an enemy aircraft when called upon to do so. This requires training in engagement procedures, which is contained in this manual.

The material contained herein is applicable without modification to both nuclear and nonnuclear warfare.

Users of this manual are encouraged to submit recommended changes or specific comments to improve the publication. Comments should be keyed to the specific page and line of text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be prepared on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commandant, US Army Air Defense School, ATTN: **ATSA-TD-DLW** Fort Bliss, Texas 79916.

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The wording in this manual should not be construed to discriminate between the sexes. In order to avoid a repetitious use of terminology he/she, the terms he, him, and his are intended to include both the masculine and feminine genders. Any exceptions to this will be noted.





PART I

The STINGER WEAPON SYSTEM and HOW to USE IT

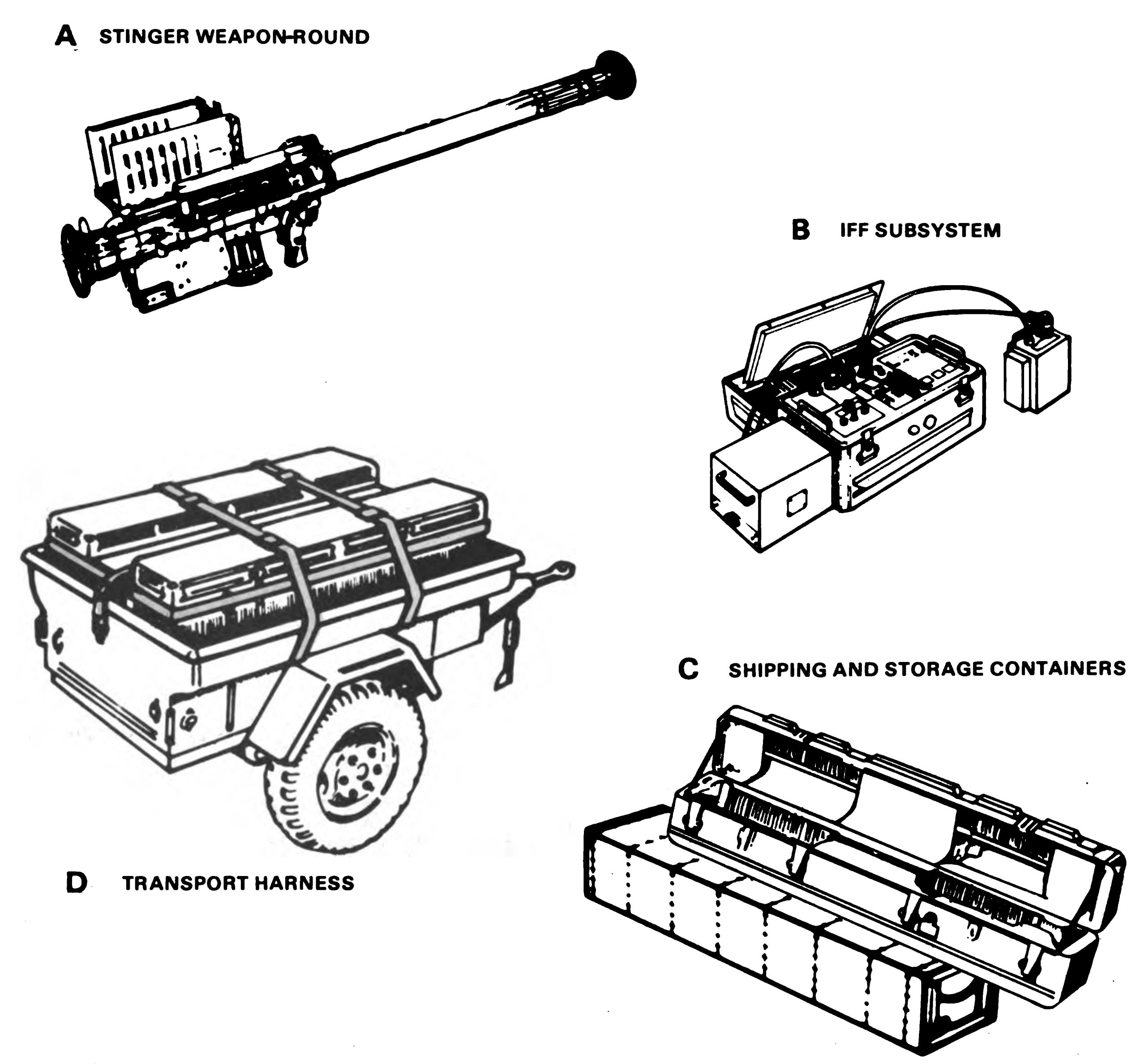
CHAPTER 1



STINGER WEAPON SYSTEM

Stinger is a man-portable, shoulder-fired, infrared homing (heat-seeking) guided missile system. Stinger provides air defense to combat arms battalions and selected combat support units. Stinger is designed to counter high-speed, low-level, ground attack aircraft. Also, it is a lethal weapon against helicopter, observation, and transport aircraft.

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The Stinger weapon system is composed of these basic items:

A ***Stinger weapon-round*** (a missile-round, separable gripstock, and battery/coolant unit combination).

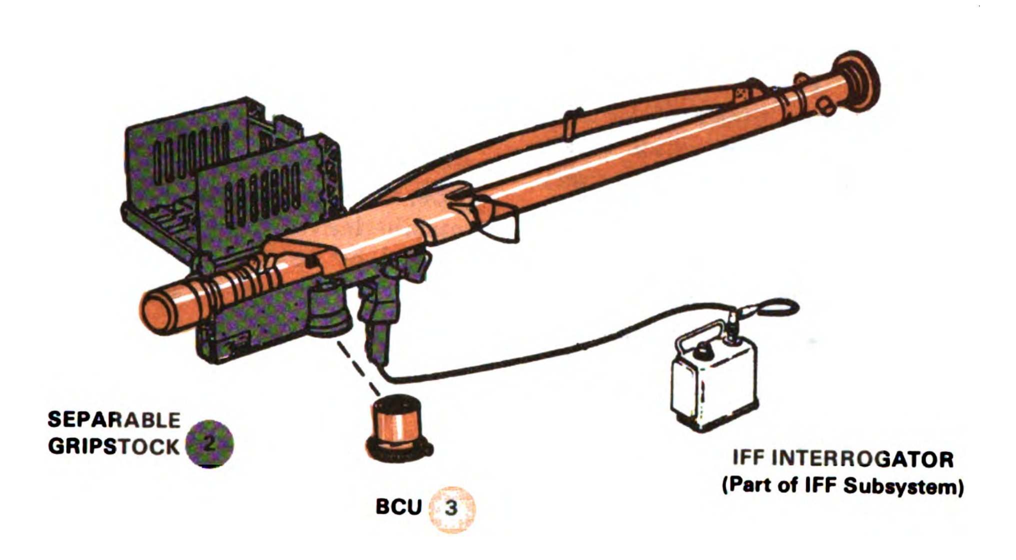
B ***Identification, friend or foe (IFF),*** subsystem. Major components consist of an IFF interrogator and IFF programmer/battery charger.

C ***Shipping and storage containers*** (weapon-round container/ready rack and missile-round container). The weapon-round container holds a missile-round, separable gripstock and three battery/coolant units. The missile-round container holds a missile-round and three battery/coolant units.

D ***Transport harness.*** This item consists of straps which hold the basic load in the ¼-ton trailer.

STINGER WEAPON-ROUND





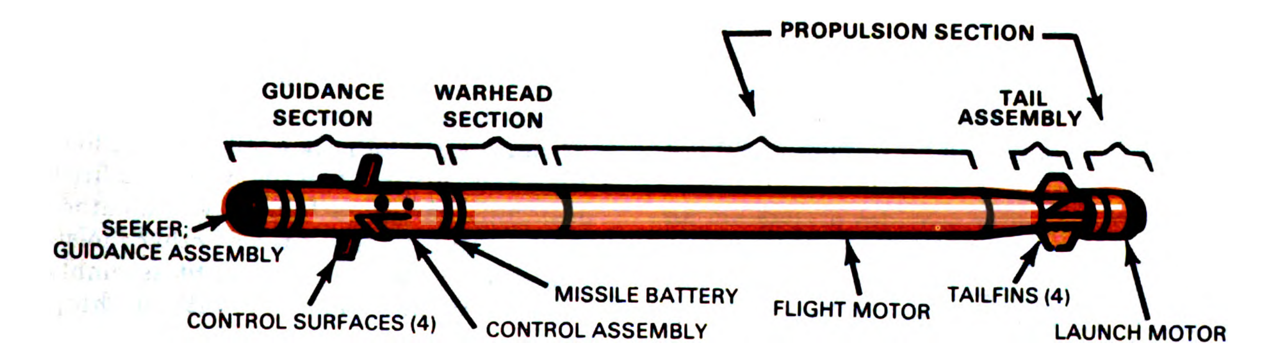
The Stinger weapon-round is made up of a 1 ***missile-round*** mated to a 2 ***separable gripstock assembly.*** A 3 ***battery/ coolant unit*** (BCU) is also required to fire the missile. ***You must have all three items to have an operational weapon.*** The weapon is 60 inches long and, with BCU inserted, weighs 34.7 pounds. When the IFF interrogator is used with the weapon, it helps identify friendly aircraft. To have this capability, you must connect the interrogator to the weapon, with its interconnecting cable.

Each team is issued four weapon-rounds and two missile-rounds.

1 MISSILE-ROUND

The missile-round consists of two major parts: the missile and the launch tube assembly.

Stinger Missile. The Stinger missile is a rocket-propelled, infrared homing (heat-seeking) missile. The missile is housed in the launch tube. Major components that make up the missile are shown below--



Guidance Section. The guidance section consists of a guidance assembly, control assembly, a missile battery, and four control surfaces. The guidance assembly processes target infrared (IR) energy and provides guidance commands for the missile during flight. The seeker tracks the IR source automatically after the gyro is uncaged and during missile flight. The control assembly converts the guidance commands into movement of control surfaces which direct the flight of the missile. The missile battery provides the inflight power for the Stinger guided missile.

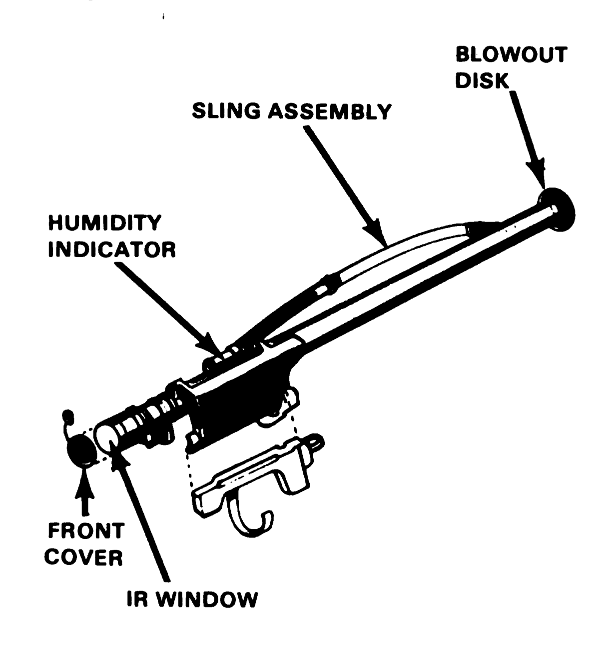
Warhead Section. The warhead section consists of a fuze assembly and a quantity of explosive, all within a cylindrical case. After the flight motor ignites, the fuze arms the warhead. The fuze can detonate the warhead in two ways: by means of a target impact switch or by a hard target sensor. Should target intercept not occur within 15-19 seconds after launch, a self-destruct circuit initiates warhead detonation. Safety features are included to insure that the missile is safe for shipping and handling.

Propulsion Section. Propulsion for the missile is developed by a separable launch motor and a dual thrust flight motor.

The launch (eject) motor provides initial thrust that ejects the missile from the launch tube. It allows the missile to coast a safe distance (about 9 meters/29 feet) from the gunner prior to ignition of the flight motor. The launch motor is expended and separated from the flight motor before the missile is out of the launch tube. The expended launch motor drops from the missile outside the launch tube at a safe distance from the gunner. Also, at separation, a lanyard attached to the launch motor pulls the shorting plug from the flight motor ignition circuit.

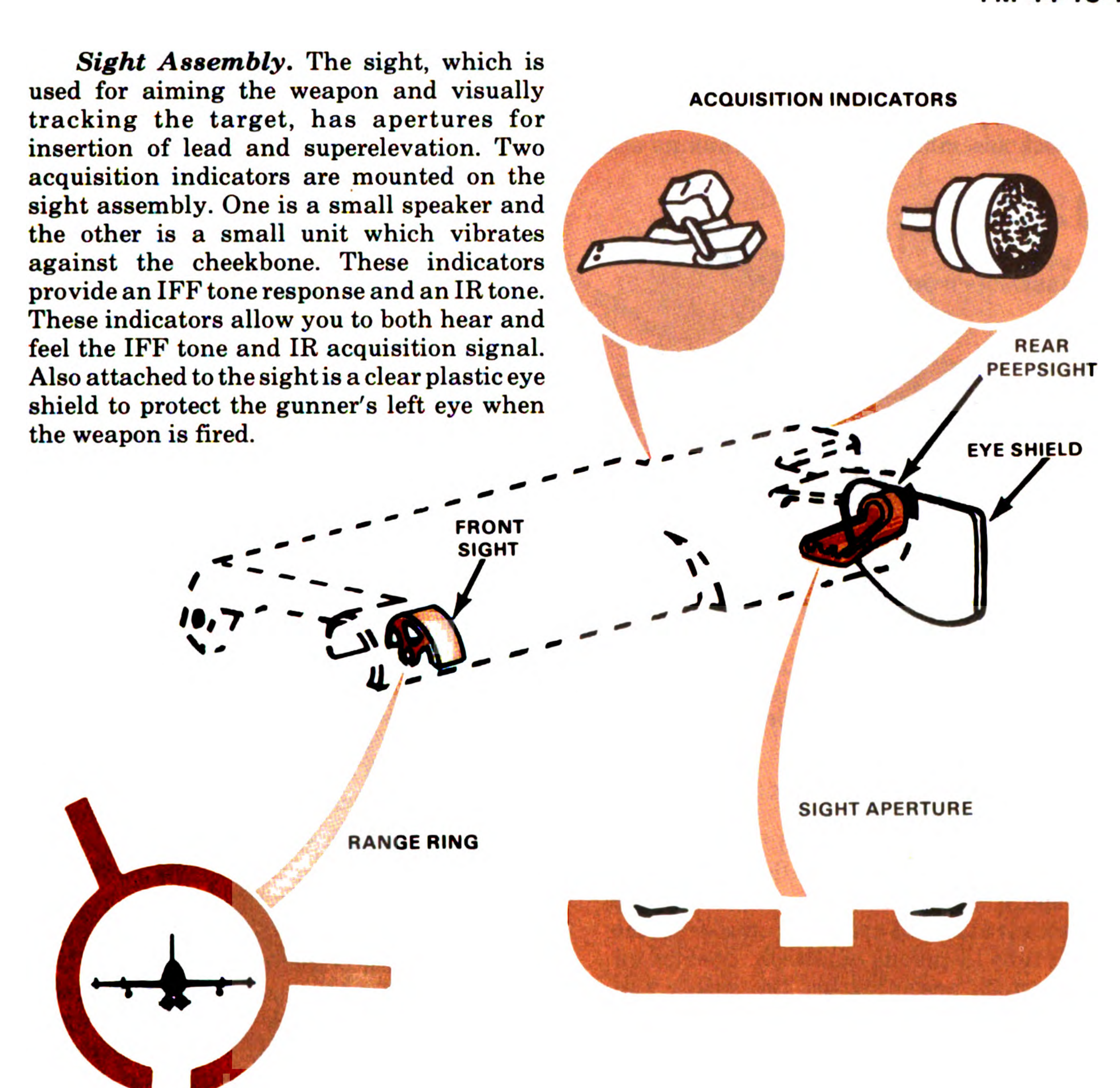
The flight motor provides propulsion for the missile during flight. The flight motor fires after the missile coasts for a safe distance from the gunner. Thrust for the flight motor is provided in two phases: boost and sustain. Initially, both burn simultaneously. The boost phase rapidly accelerates the missile to its top speed. The boost phase ends, but the sustain phase continues. The sustain phase maintains the missile speed for a time sufficient to complete the mission.

Tail Assembly. The tail assembly consists of four folding tail fins that provide roll and missile stability. Within the launch tube, the fins are in a folded position. As the missile leaves the launch tube, they are erected by spring action and by the force generated by missile spin, and then locked into place.



Launch Tube Assembly. The fiberglass tube is the main support for all other parts of the launcher. Both ends of the launch tube are sealed with breakable disks. The IR window (front disk) is transparent to IR radiation. Both IR window and blowout disk (rear) break when the missile is fired. A desiccant cartridge/humidity indicator on the launch tube indicates whether moisture has entered the tube. The sight assembly is attached to the launch tube with two hinges.

Sight Assembly. The sight, which is used for aiming the weapon and visually tracking the target, has apertures for insertion of lead and superelevation. Two acquisition indicators are mounted on the sight assembly. One is a small speaker and the other is a small unit which vibrates against the cheekbone. These indicators provide an IFF tone response and an IR tone. These indicators allow you to both hear and feel the IFF tone and IR acquisition signal. Also attached to the sight is a clear plastic eye shield to protect the gunner's left eye when the weapon is fired.



The open sight of the Stinger weapon consists of a front sight with range ring, a sighting aperture with three open reticles, and a rear peepsight.

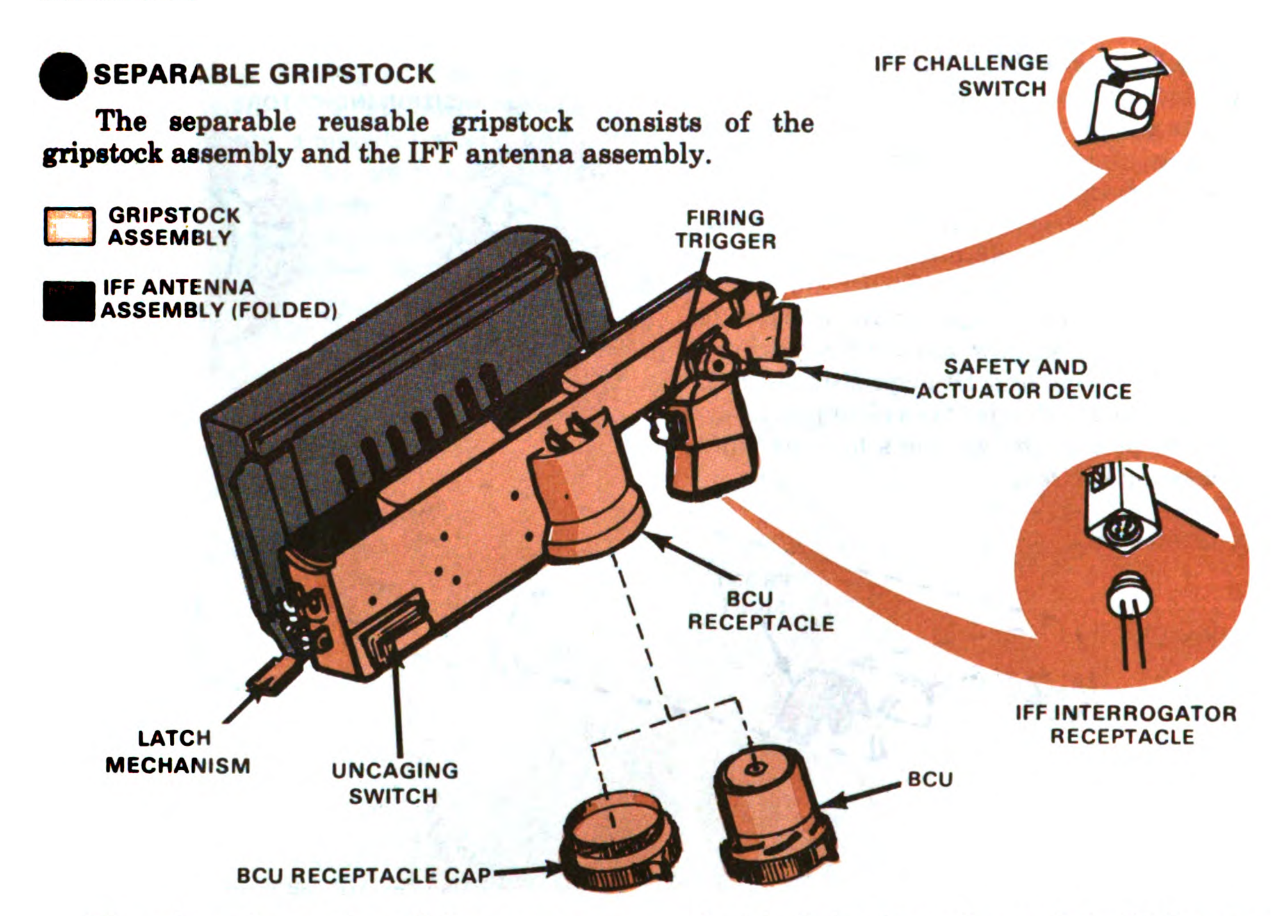
The range ring is used by the gunner to determine if the aircraft is in range and also to visually track it.

The rear sight ring provides for insertion of superelevation and lead. Superelevation is an additional elevation angle which corrects for the effects of gravity on the missile. Lead is applied to assist the missile on its flight path to the target. Lead is applied to all targets except directly incoming or outgoing fixed wing aircraft.

The peepsight is located at the rear of the sight and is used by the gunner to properly aline the other elements of the sight.

2 SEPARABLE GRIPSTOCK

The separable reusable gripstock consists of the gripstock assembly and the IFF antenna assembly.



The gripstock contains all the necessary circuits and assemblies that allow the gunner to prepare and launch the missile. The gripstock is attached to and removed from the launch tube by means of a latch. Located on the gripstock assembly are the safety and actuator device, uncaging switch, firing trigger, IFF challenge switch, IFF interrogator connector, and BCU receptacle.

The antenna assembly folds on the right side of the gripstock when not in use. When it is unfolded and the interrogator is connected to the weapon, it is capable of interrogating aircraft and receiving coded replies. After a missile is fired, the separable gripstock is removed from the launch tube assembly for reuse. The separable gripstock assembly can be reused until failure.

3 BATTERY/COOLANT UNIT (BCU)

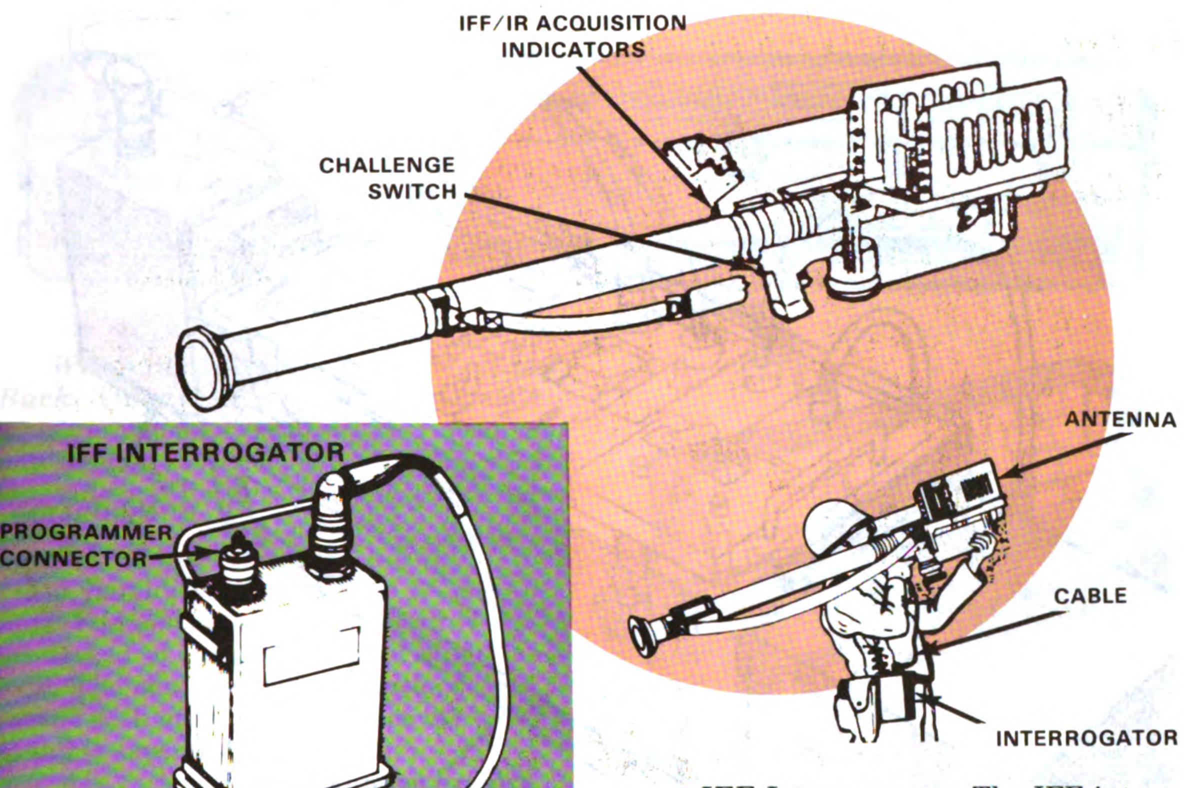
A BCU is used to energize the weapon electrical circuits and to cool the IR detector in the missile seeker prior to launch.

The BCU contains a battery and pressurized argon gas coolant. The BCU is activated when the safety and actuator device on the gripstock is pressed forward. Once activated, the BCU supplies electrical power and seeker coolant to the weapon for 45 seconds or until missile launch. The BCU is not reusable after it is activated. Three BCUs are supplied with each weapon-round and missile-round.

CAUTION

Do not discard the used BCU into dry brush, grass, or near flammable materials as it is extremely hot. Handle the BCU only by the plastic cap.

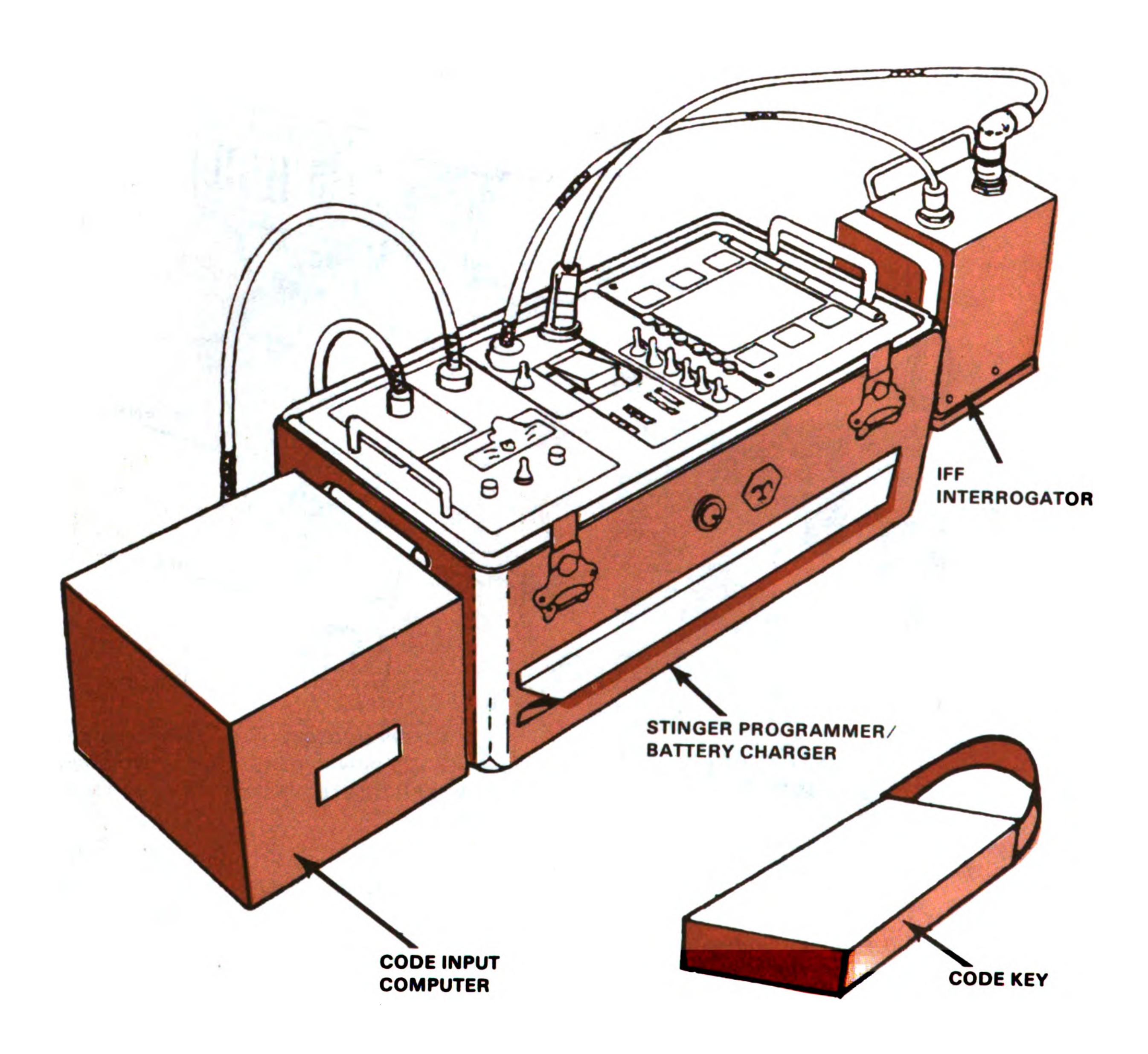
STINGER IDENTIFICATION, FRIEND or FOE (IFF), SUBSYSTEM



The Stinger IFF subsystem is a part of the Stinger weapon system. Components of the IFF subsystem used by the gunner are the interrogator and interconnecting cable. The IFF interrogator, when connected to the weapon, transmits a challenge (interrogation) to a potential target. If no reply or an improperly coded reply is received, the aircraft is classified as an "unknown," possibly a foe. Detailed IFF interrogation procedures may be found in chapter 4. On-board weapon IFF components include the challenge switch, acquisition indicators and IFF antenna assembly. A programmer/battery charger, code input computer, shipping and storage containers, and code keys are used to support the IFF subsystem.

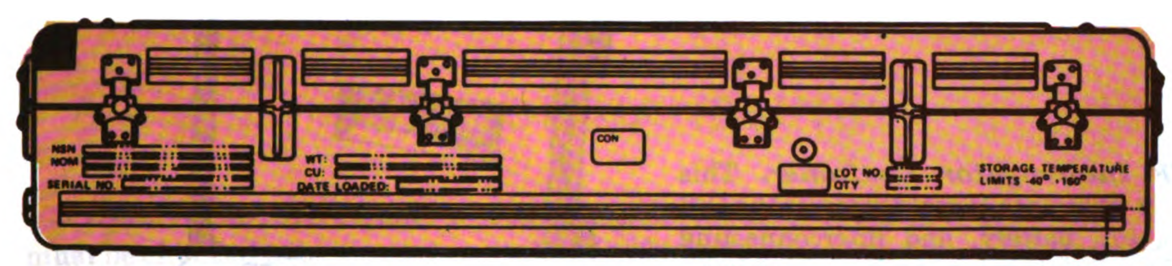
IFF Interrogator. The IFF interrogator is a battery powered unit that is attached to your belt. It contains IFF system electronics.

The interrogator is connected to the weapon by a quick-release, plug-in cable. When not in use, the IFF interrogator with its cable attached is stored in the interrogator shipping and storage container. The interrogator weighs about 6 pounds and is programmed with an interrogation code. It can be programmed to operate in mode 4 secure code for 4 days. Within 4 days, a new or recharged battery must be installed and the unit reprogrammed. Unless it is reprogrammed, the system automatically shifts from mode 4 to mode 3. It remains in this mode of operation until the batteries are discharged or the system is reprogrammed. Arrangements for IFF battery replacement and reprogramming (such as date, time and location) are made by the section chief and are based on the tactical situation.



Other IFF Subsystem Equipment. The purpose of the programmer/battery charger is to program the IFF interrogator with mode 4 codes and to charge the battery. This equipment is located at the section headquarters. The code input computer and code keys are required to program the mode 4 codes into the interrogator. The keys are used to insert the proper code into the computer. The computer inserts the data into the interrogator through the programmer. The battery charger will charge from one to six batteries. Operating instructions are found in TM 9-1425-429-10.

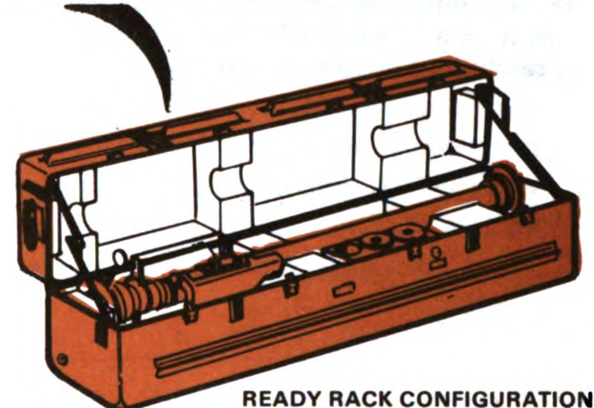
SHIPPING and STORAGE CONTAINERS



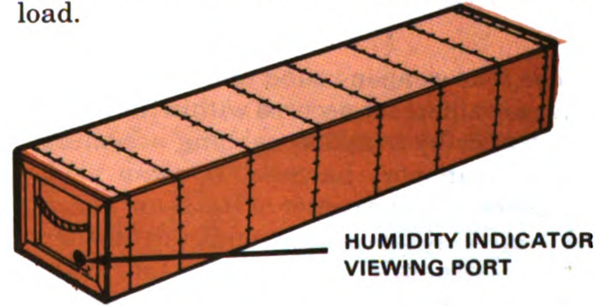
Weapon-Round Container/Ready Rack. This container is an aluminum box which provides environmental protection for one weapon-round and three BCUs during shipping and storage. It also contains one set of ear plugs. It is equipped with four latches, handles for two-man carry, a pressure relief valve, humidity indicator, and BCU storage area. Four of these containers with weapons are issued to each team as part of its basic load. The containers and gripstocks will be reused with missile-rounds once the weapon-round is expended.

A container is converted to a ready rack by releasing the latches which make the weapon-round, with BCU inserted, readily accessible. When used as a ready rack, the closed container provides limited environmental protection for the weapon-round with BCU installed. The ready rack set-up helps provide the capability for a gunner to open the container, remove, and shoulder the weapon within 10 seconds.

Missile-Round Container. This container is a wooden box which provides adequate protection for one missile-round and three BCUs during shipping and storage. It also contains one set of ear plugs. The missile-round and three BCUs are wrapped in a sealed barrier bag with desiccant for protection against the environment. A humidity indicator is inclosed in the bag to indicate moisture content. The sides of the box are wire bound. Two of these boxes

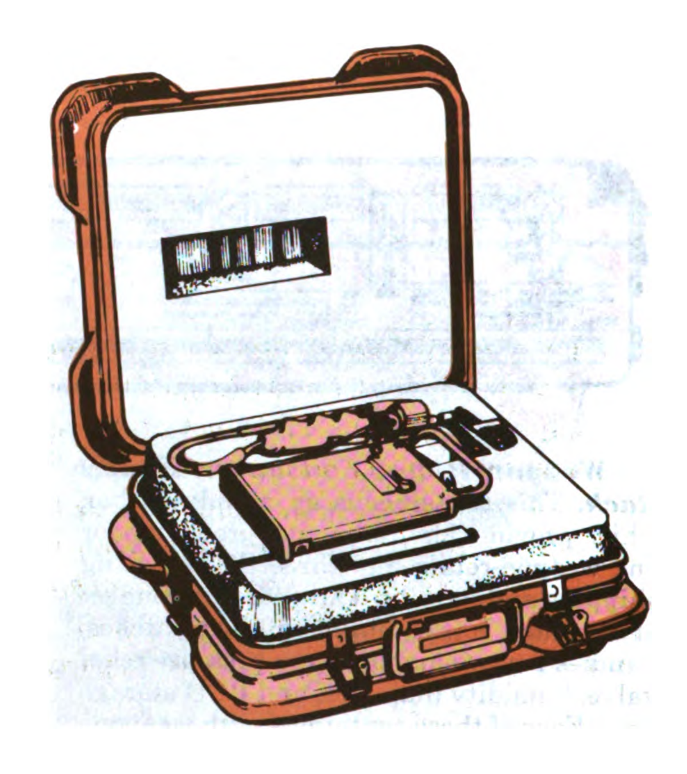

READY RACK CONFIGURATION

containing missile-rounds are issued to each team as the remaining part of their basic load.



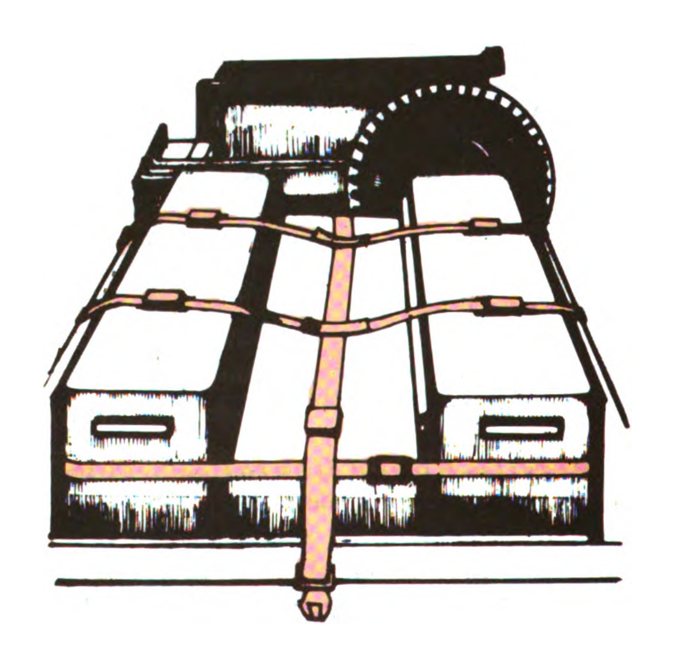
As rounds are expended, the gunner simply opens a missile-round container, removes the missile-round, mates the gripstock of the expended round to the new missile-round, and inserts a BCU. He then has a complete weapon-round to use if needed.

Empty missile-round containers are kept to maintain the stability of the containers in the trailer until resupply. At this time, the empty containers are replaced with full containers.



IFF Interrogator Container. This reuseable fiberglass container stores the IFF interrogator, battery, and interconnecting cable. The container is not pressurized, but it does contain a pressure relief valve to release any pressure build-up within the container.

TRANSPORT HARNESS



The four weapon-round and two missile-round containers are secured within the M416 ¼-ton trailer by a nylon webbing assembly called a transport harness. A strap runs lengthwise over the center of the ¼-ton cargo trailer and fastens to either end of the trailer by snap fasteners. From this strap, four other straps lead, two to each side, through quick-release buckles to the sides of the trailer. The quick-release buckles allow immediate access to the weapons. Another strap runs completely around the outside of the top three containers.

CHAPTER

WEAPON HANDLING

Upon receipt of a Stinger weapon from the ammunition supply point (ASP), it must be checked to be sure it is suitable for firing. The weapon is removed from the shipping and storage container and inspected in accordance with the "services upon receipt" checks which are found in TM 9-1425-429-10. This field manual does not cover preventive maintenance checks and services. However, this chapter does contain an abbreviated set of weapon checks which may be made under field conditions when time and the tactical situation permit. In addition, this chapter describes weapon handling and safety precautions which must be followed by Stinger gunners to prevent injury to personnel and damage to equipment.

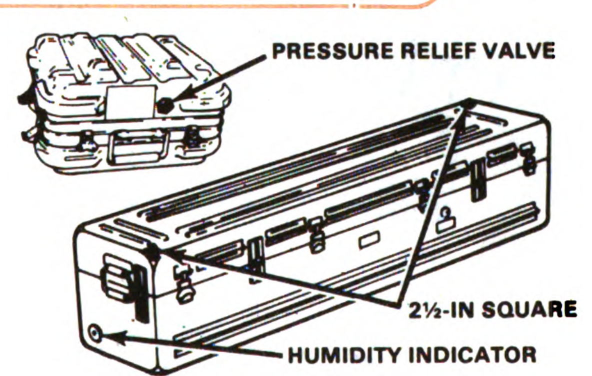
CONTENTS

HANDLING PROCEDURES

When the Stinger team first receives a weapon, the markings on the container (case) should be checked to be sure that it contains the proper weapon. The yellow squares on two diagonally opposite corners on the case and the yellow data markings indicate it contains a live round.

Containers for trainers are marked with blue colored squares for the tracking head trainer and bronze for the field handling trainer. In addition, the data markings are white, and these containers have the word "INERT" on the top of the case.

Other Stinger equipment and trainer markings are found in TM 9-1425-429-10 and TM 9-6920-429-10.



The Stinger weapon-round and IFF interrogator containers are sealed to prevent environmental damage. Before the cases are opened, the pressure relief valve should be pressed with the finger. When the rushing noise (if any) stops, the internal pressure of the case is the same as the pressure outside the case. The missile-round container is not sealed.

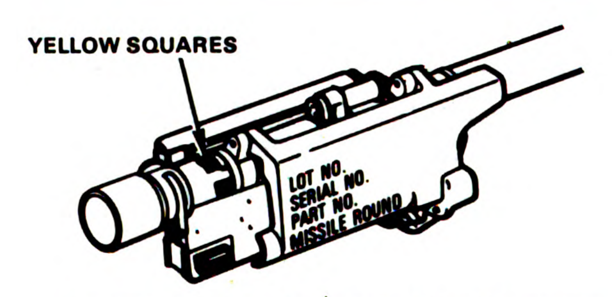
CAUTION

Improper handling can cause sight misalinement or electrical/mechanical part damage.

When out of its container, the weapon should be rested only on its left side (sight assembly). Do not stand the weapon on end or lay it on its right side.

WARNING

Do not fire if weapon-/missile-round container has been dropped 5 feet or more.



Be sure that the missile-round has the proper color markings -- four 1-inch yellow squares. If it does not, return it to the ammunition supply point (ASP) and exchange for another weapon.

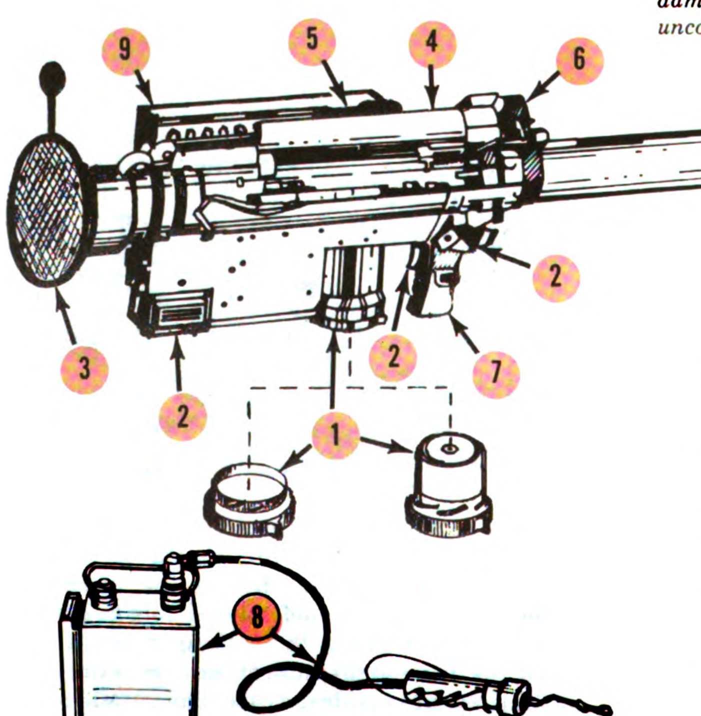
While the gunner is walking, he should carry the weapon by placing the carrying sling over his shoulder. The front end should point upward or horizontally. The sling should be tight enough to prevent the weapon from swinging.

The protective covers (front-end cap and IFF connector cap) should not be removed until preparing to fire or while inspecting the weapon.

ABBREVIATED WEAPON CHECKS

If the Stinger weapon is issued in the field and sufficient time is not available to perform all the checks listed in the technical manual, the team chief or gunner must, as a minimum, make the checks listed on the following pages. Under field conditions, these checks should be made on a daily basis if the tactical situation allows. They should be made at those times when the team is in a reduced state of alert. These checks are especially important for those weapons which have been outside of their containers and exposed to bad weather.

NOTE: *Although sunlight normally will not cause damage to the seeker, care should be taken to keep the uncovered seeker pointed away from the sun.*



ITEMS TO CHECK

1. BCU RECEPTACLE CAP, BCU RECEPTACLE, and BCU
2. SAFETY and ACTUATOR DEVICE, UNCAGING SWITCH, and FIRING TRIGGER
3. IR WINDOW (front disk) and BLOWOUT DISK (rear)
4. SIGHT ASSEMBLY
5. HUMIDITY INDICATOR
6. ACQUISITION INDICATORS
7. IFF RECEPTACLE
8. IFF INTERROGATOR and IFF INTERCONNECTING CABLE
9. IFF ANTENNA

1 BCU RECEPTACLE CAP, BCU RECEPTACLE, and BCU

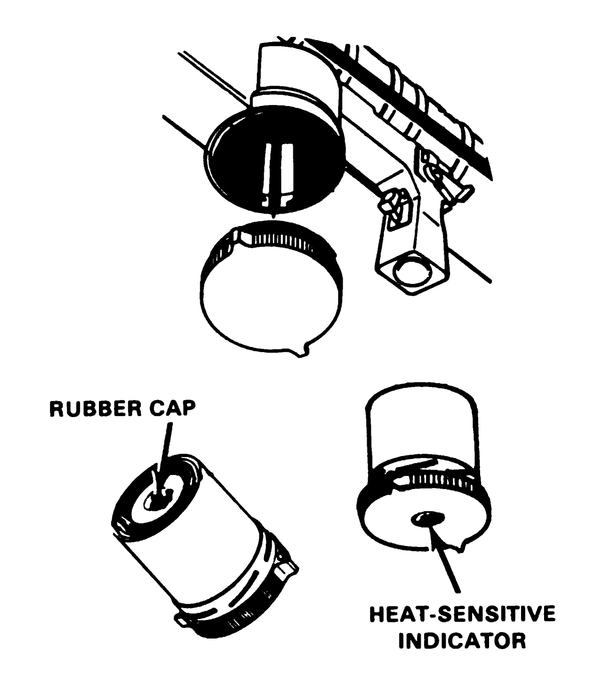
BCU Receptacle Cap and Receptacle

- Remove BCU receptacle cap and check gasket. If missing or damaged, replace.
- Check BCU receptacle interior for foreign matter and clean contacts.
- Replace BCU cap before making remainder of the checks.

BCU (all three)

- Check that rubber cap is over BCU needle. If the cap is missing or damaged, discard BCU.
- Check heat-sensitive indicator for pink color. If gray, discard BCU.

***NOTE:* Under tactical conditions, when no other BCUs are available you may use an otherwise defective BCU -- Use only as a last resort.**



2 SAFETY and ACTUATOR DEVICE, UNCAGING SWITCH, and FIRING TRIGGER

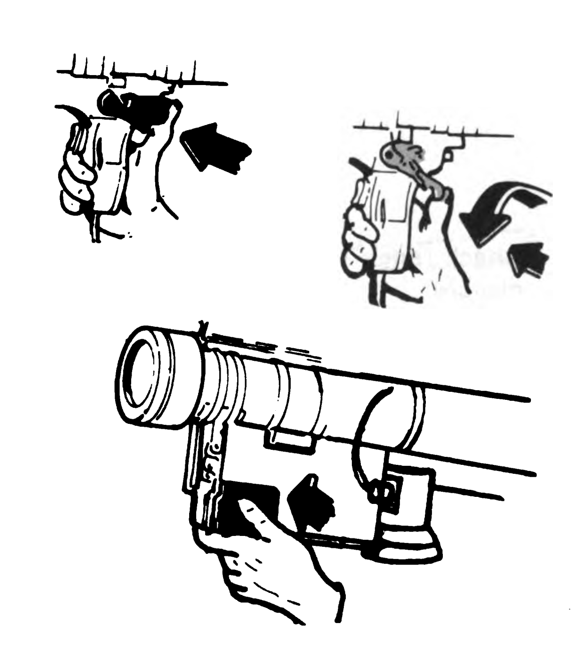
> ***WARNING***
>
> **Be sure that BCU is NOT inserted during this check.**

Safety Actuator Device

- Depress safety and actuator device and rotate it out and forward until it stops. A click should be heard.
- When released, device should return to its original position and lock.

Uncaging Switch

- Depress uncaging switch three times: once at each end, and once in the middle. A click should be heard each time.
- The switch should return to its normal position each time when released.



Firing Trigger

- Pull firing trigger to its limit. A click should be heard. When released, it should return to its normal position.



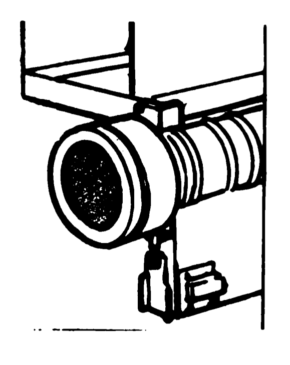
3 IR WINDOW and BLOWOUT DISK

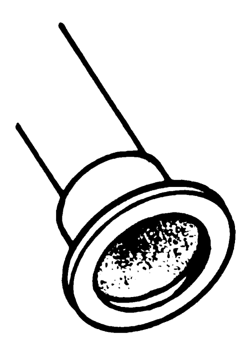
IR Window

- Check IR window (front disk) for foreign matter. Clean with lens cleaning tissue. Inspect for breakage or scratches.

Blowout Disk

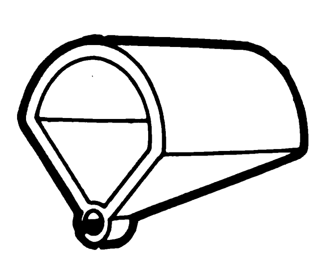
- Check blowout disk (rear) for foreign matter. Clean with lens cleaning tissue. Inspect for damage.



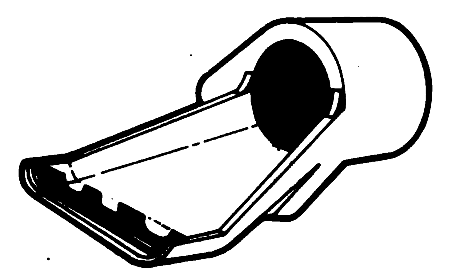


4 SIGHT ASSEMBLY

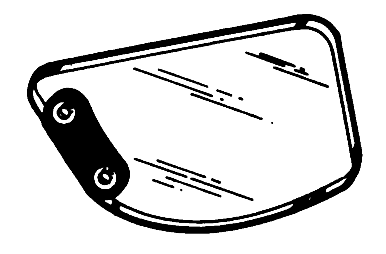
- Check range ring for visible damage and closure.
- Check rear sight reticle and eyeshield for damage or breakage.
- Replace eyeshield if visibly damaged.



RANGE RING



REAR SIGHT RETICLE

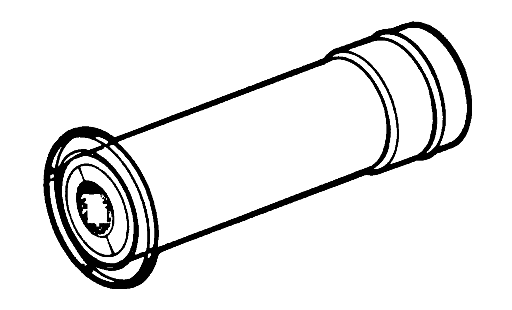


EYESHIELD

5 HUMIDITY INDICATOR

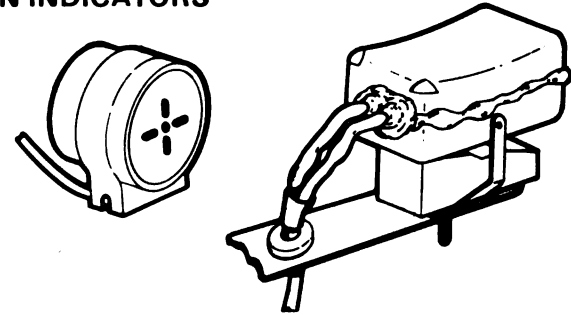
- Check desiccant cartridge/humidity indicator for green color. If tan, replace indicator unit.

NOTE: If replaced, check color again in 24 hours. If tan color appears again, replace weapon.



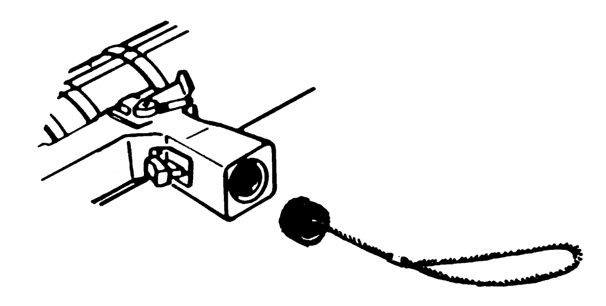
6 ACQUISITION INDICATORS

- Check acquisition indicators for visible damage. If damaged, return weapon to ASP.

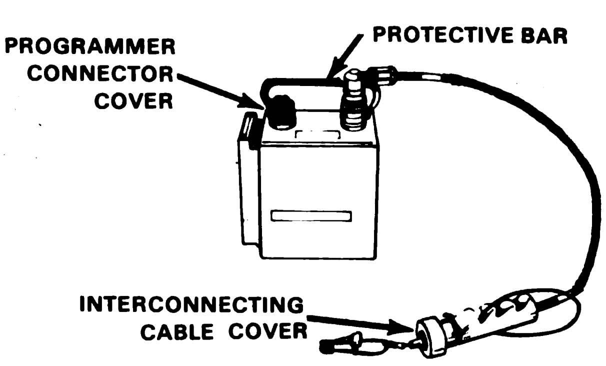


7 IFF RECEPTACLE

- Check IFF receptacle interior for foreign matter. Insure contacts are clean.
- Check condition of IFF connector cap. Replace if missing or damaged.

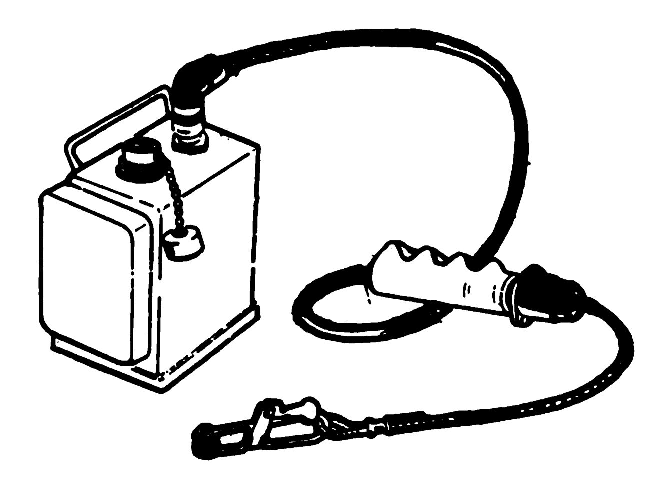


8 IFF INTERROGATOR and IFF INTERCONNECTING CABLE



IFF Interrogator

- Check interrogator to be sure it has not been dropped or mishandled.
- Check that protective bar is welded to case and protective cover is not damaged. Replace interrogator, if necessary.

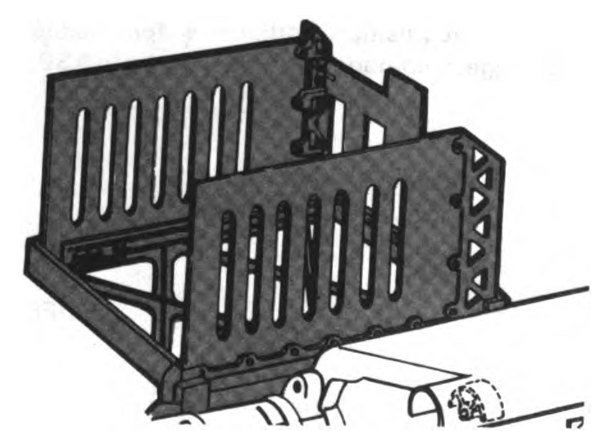


IFF Interconnecting Cable

- Check IFF cable for visual damage, or breakage. If broken or cut, replace cable.
- Remove interconnecting cable cover and inspect cable connector for dirt or other contamination. Clean, if necessary.
- Check programmer connector cover. If it is missing or damaged, or if the fastener does not function properly, replace.



IFF ANTENNA



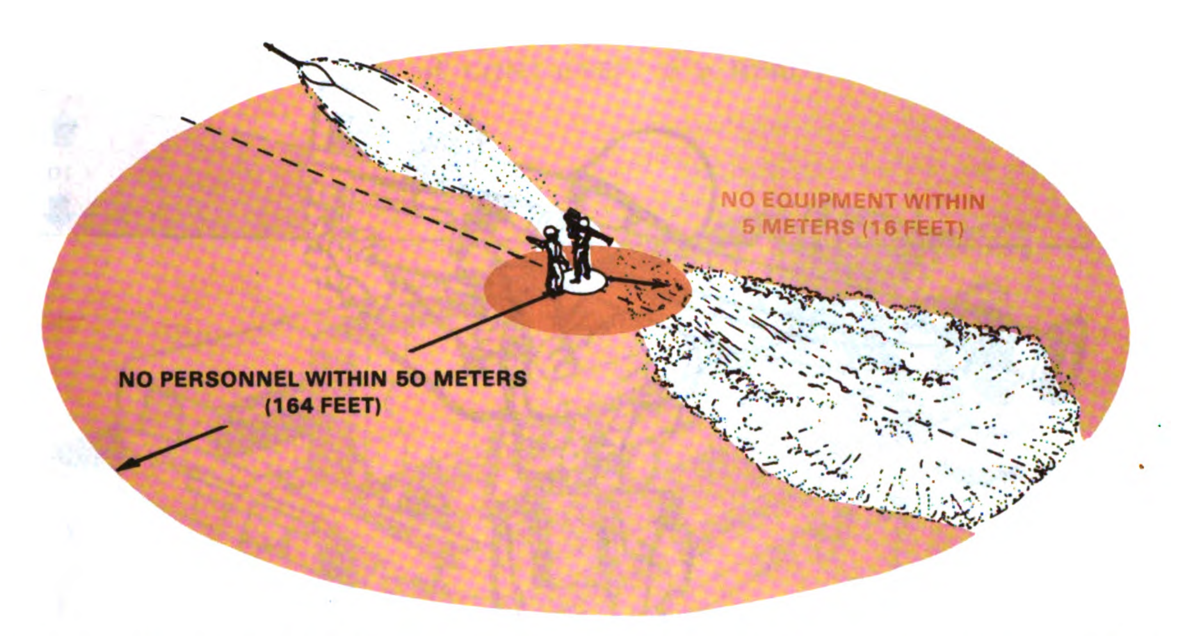
- Unfold IFF antenna and check for breakage or damage.

SAFETY PRECAUTIONS

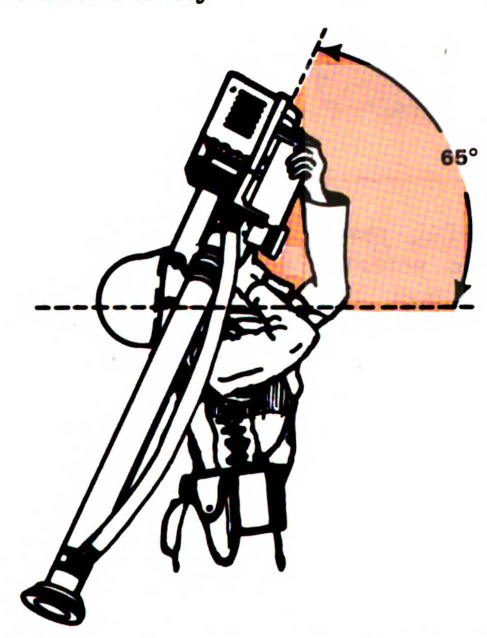
Firing Safety Precautions. The following safety precautions should be observed for all firings:

- Fire only from a standing position.
- Wear ear protectors, helmet, and flak jacket when firing. Personnel within 125 meters (about 400 feet) should also wear ear protectors.
- Use the plastic eyeshield on the weapon sight.

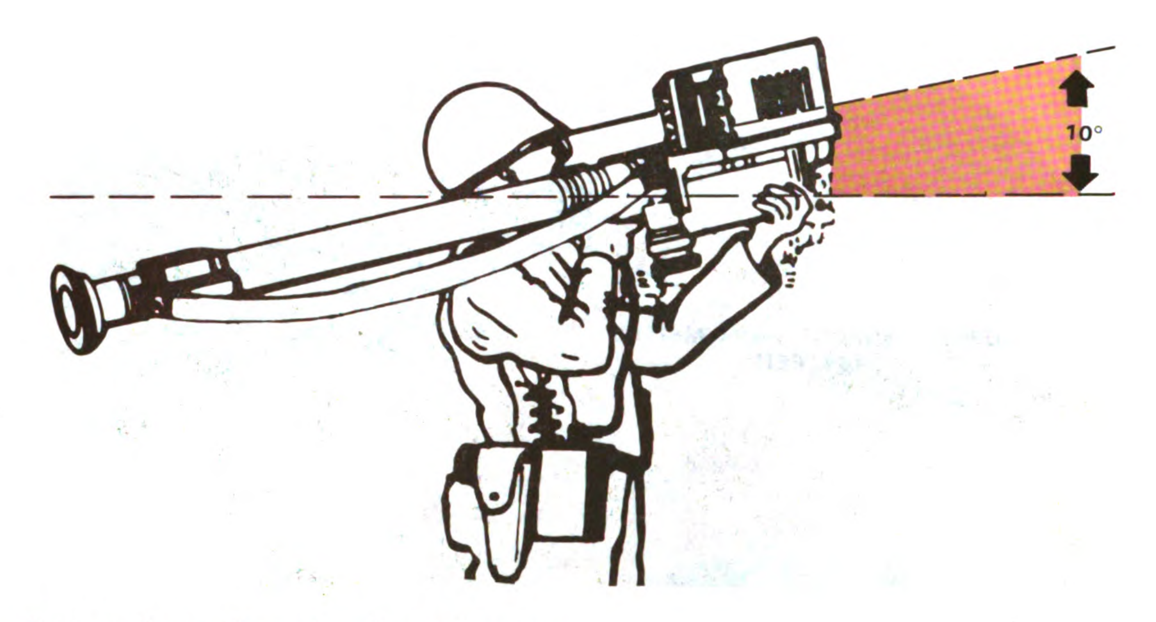




- Insure that the area behind the weapon is clear of other personnel to a distance of 50 meters (164 feet). The team chief should be close to the gunner's side and assure that he is not endangered by the weapon backblast. Allow at least 5 meters safety distance from equipment (e.g., a vehicle). Under combat conditions, this safety distance for equipment may not always be feasible. Damage to equipment may result if it is within the backblast area.



Maximum Firing Angle. Do not fire at an angle greater than 65°. The flying debris caused by the missile backblast presents a hazard to the gunner if this angle is exceeded or if the launch tube is within 30 inches of the ground.



Superelevation Angle. Always superelevate. By superelevating, you make use of a built-in 10° angle that compensates for missile drop in flight.

BATTERY/COOLANT UNIT (BCU) INSERTION and REMOVAL

WARNING

Before inserting the BCU, make certain that the safety and actuator device is in the SAFE position. The Stinger weapon is shipped with a cap covering the BCU receptacle. The cap should be kept in place until just prior to BCU insertion. Remove the receptacle cap by turning it counterclockwise. Place it in the BCU container found in the shipping or storage container for use at another time. You can also place the cap on some convenient location on the body (pocket, inside shirt, etc). Insert a BCU into the receptacle and turn it clockwise until it locks in place.

WARNING

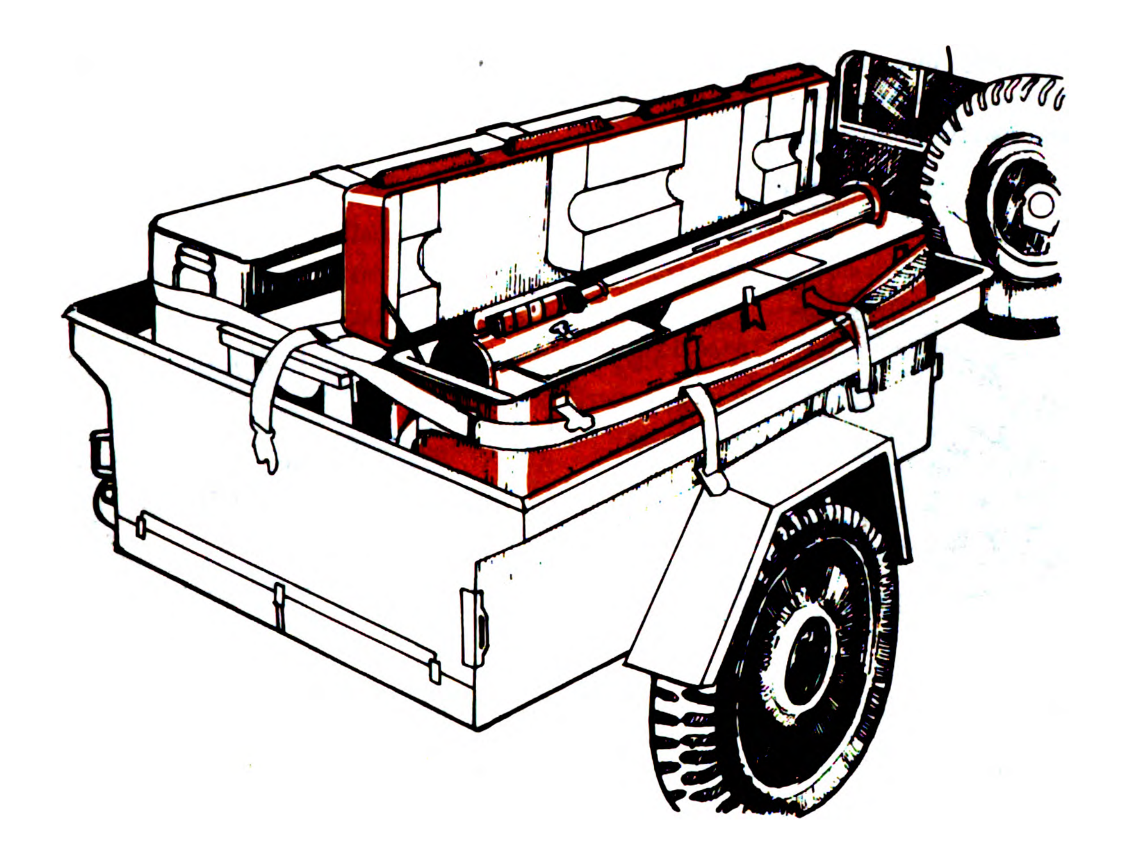
The case of the BCU gets extremely hot (400°F.) 3 to 5 minutes after activation and remains too hot to touch for approximately 30 minutes. Do not touch the case except at the heat-insulated cap of a newly fired BCU when removing it from the BCU receptacle. Remove the BCU immediately after firing (or within 45 seconds after activation) by grasping the heat-insulated cap and turning it counterclockwise. After use, it must be discarded. Replace the expended BCU with an unused BCU as explained above.

CAUTION

Do not discard the used BCU into dry brush or grass, or near flammable materials.



CONVERSION of CONTAINER to a READY RACK



The gunner converts a container to a ready rack by using the following procedures:

1 Unlatch the four latches and lift the container lid.

2 Remove the weapon from the container.

3 Remove the BCU receptacle cover and stow it in a clothing pocket or other suitable place.

4 Insert the BCU into weapon. Place two remaining BCUs in BCU pouches, with the contact rings downward.

5 Remove IFF interrogator dust cap and stow it in a clothing pocket or other suitable place.

6 Remove styrofoam packing cube.

7 Place weapon back on ready rack.

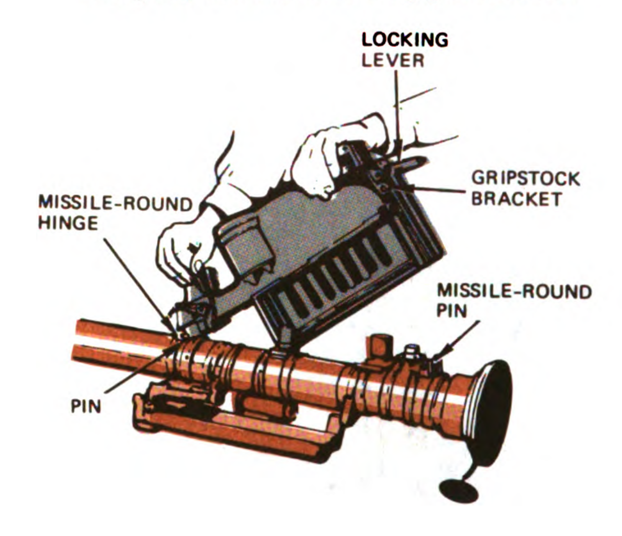
8 Lower the container lid and relatch the four latches.

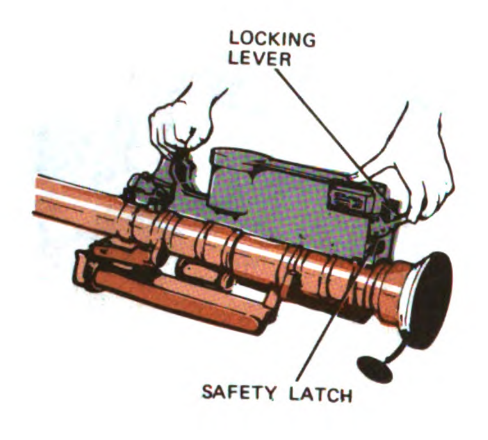
9 Fasten the transport harness securely.

10 Unlatch the container lid.

WEAPON MATING PROCEDURES

The Stinger team has four completely assembled weapon-rounds in metal containers/ready racks. However, only the two top containers can be used as ready racks at any one time. Two missile-rounds (without gripstocks) are in wooden containers. To assemble another weapon-round using the gripstock from a spent weapon, use the following procedures:





1 Refold the IFF antenna.

2 Unplug or disconnect IFF interconnecting cable.

3 Unlatch/remove the gripstock assembly from the spent launch tube.

4 Open wooden missile-round container, open the barrier bag, and remove the missile-round. Place barrier bag in container and close container.

5 Attach and latch gripstock to the missile-round (attachment of gripstock to a missile-round and removal of gripstock from an expended weapon are described in chapter 17).

6 Insert BCU into the gripstock.

7 Remove acquisition indicator styrofoam packing cube.

8 If needed, place remaining BCUs into BCU pouches or in the BCU storage space within the ready rack.

9 Place assembled weapon into ready rack.

10 Lower ready rack cover and fasten the latches.

11 Place empty missile-round container in trailer.

12 Fasten the transport harness.

13 Release the ready rack container latches.



CHAPTER

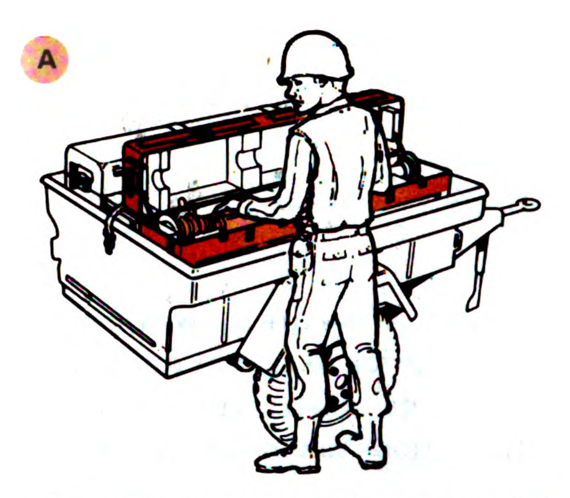
FIRING the STINGER

This chapter describes the steps required to operate and fire the weapon. It describes how the gunner prepares the weapon prior to firing and all subsequent steps of weapon operation through target destruction. If the firing sequence is interrupted for any reason, the actions taken to reacquire the target and complete the firing sequence are also discussed. The Stinger gunner must have a firm understanding of the basics of weapon operation prior to conducting an engagement.

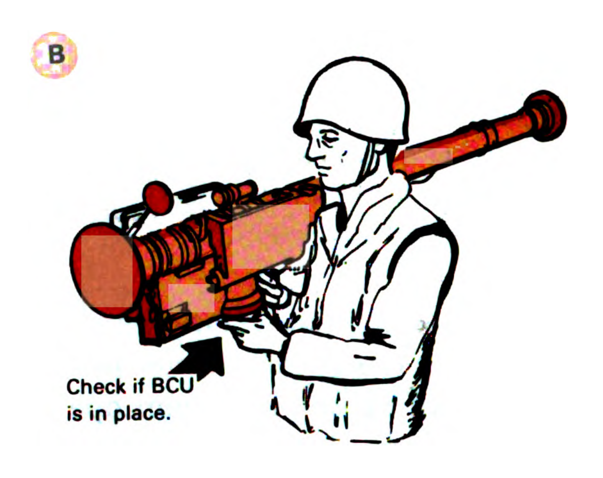
CONTENTS

READYING the STINGER for FIRING

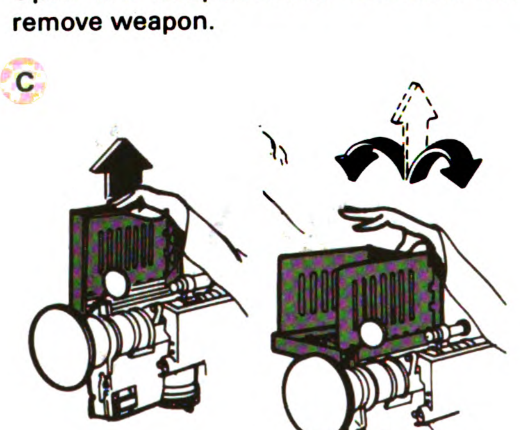
Prior to engaging targets, the Stinger weapon must be readied for action. As a starting point, assume that the Stinger team is on site with its basic load of weapons. Two of the weapons have BCUs inserted and these weapons are in the container/ready racks on the team trailer. The IFF interrogator is on the equipment belt with the interconnecting cable attached to it. The gunner readies the weapon for firing by performing the following steps.



Open the weapon-round container and. remove weapon.

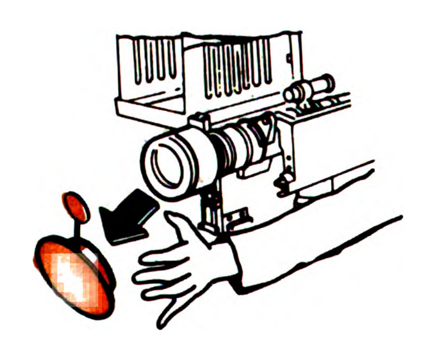


Place weapon on right shoulder.

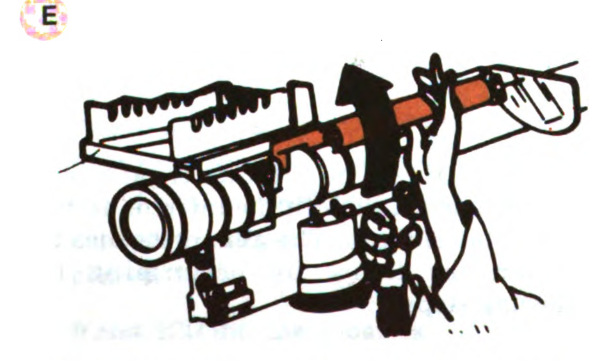


Unfold antenna with left hand.



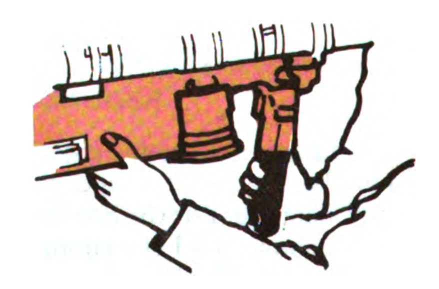


Remove the front end cap with the left hand.



With the left hand raise the sight assembly into position.





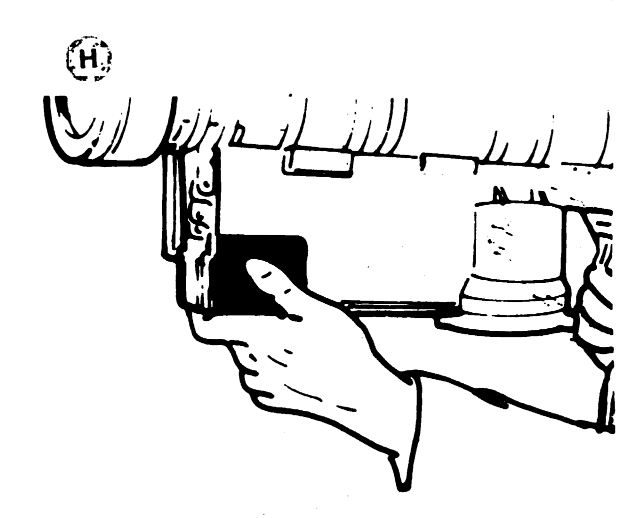
Hold gripstock with left hand. With right hand insert IFF interconnecting cable into gripstock.

G



Slide the right hand up to the trigger grip and hold.

H

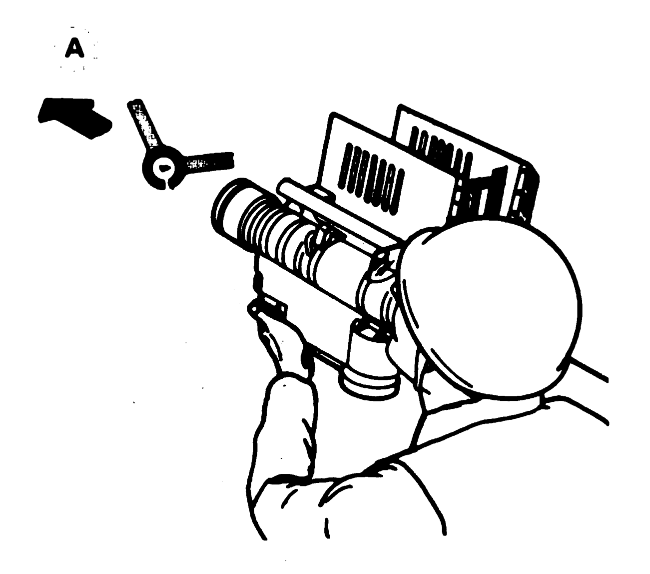


Move left hand to gripstock--grasp uncaging switch BUT DO NOT press the switch.

IFF INTERROGATION

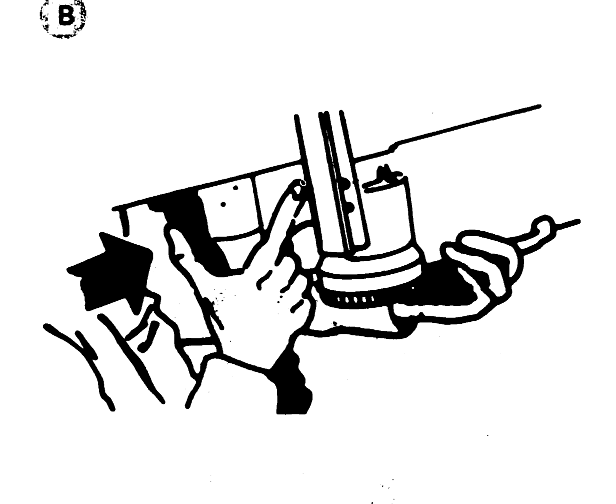
When the target is visually detected, the gunner points the launcher toward the target. He sights over the sight assembly and then looks into the peep sight. Next, he positions the target image into the center of the range ring. He challenges the aircraft if it has not been positively identified as friendly. Chapter 4 discusses when to challenge and under what conditions.

A



Point weapon at target and center target in range ring (upper circle).

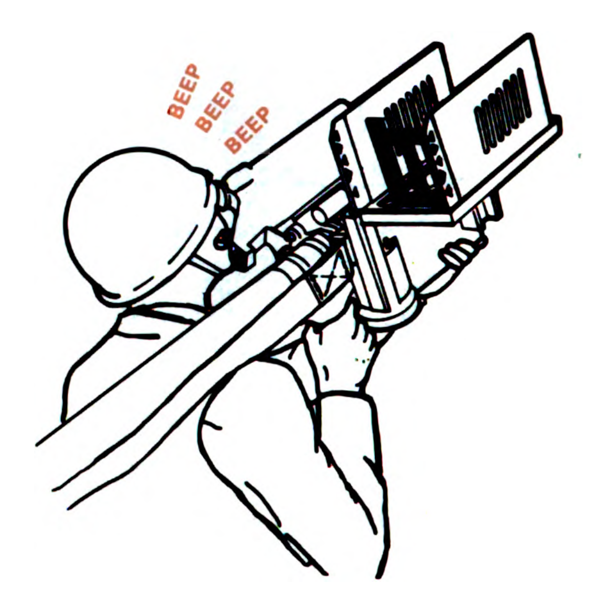
B



Press IFF challenge switch (if target has already been identified skip this step).



C Listen for IFF response.

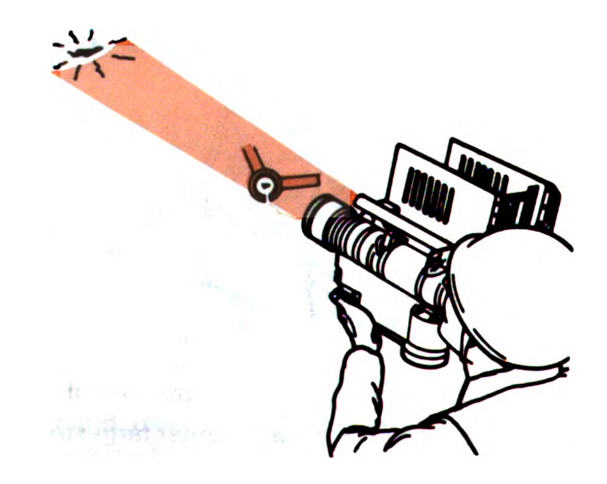


- Many "beeps" means an unknown target.
- Two "beeps" means a mode 4 reply.
- One "beep" means a mode 3 reply.
- No "beep" means a malfunction.

Depending upon the IFF response and the rules of engagement, the gunner either disengages or proceeds to engage the target.

TRACKING

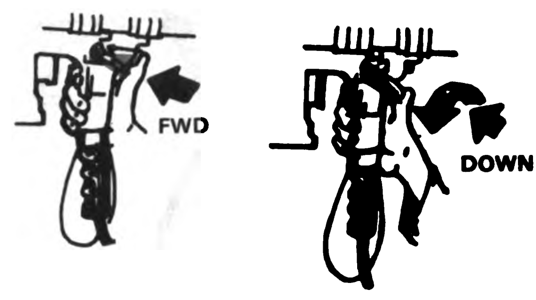
The gunner initially tracks the target by keeping it in the range ring. The gunner's stance and aiming at the target help him to determine the aircraft's direction of flight. The stance requires that the gunner step directly toward the aircraft with his left foot and lean into the weapon. He then applies the technique of fire applicable to the type of aircraft being engaged. Target tracking occurs prior to weapon activation and continues throughout the firing engagement. Target tracking is further discussed in chapter 6.



BEGIN TRACKING AND RANGING TARGET

WEAPON ACTIVATION

The gunner activates his weapon as soon as required by firing doctrine. Firing doctrine is described in chapter 6. Weapon activation occurs when the gunner operates the safety and actuator device. He presses the device forward and down with his right thumb until he hears a click. This activates the BCU. The gunner then releases the safety and actuator device.



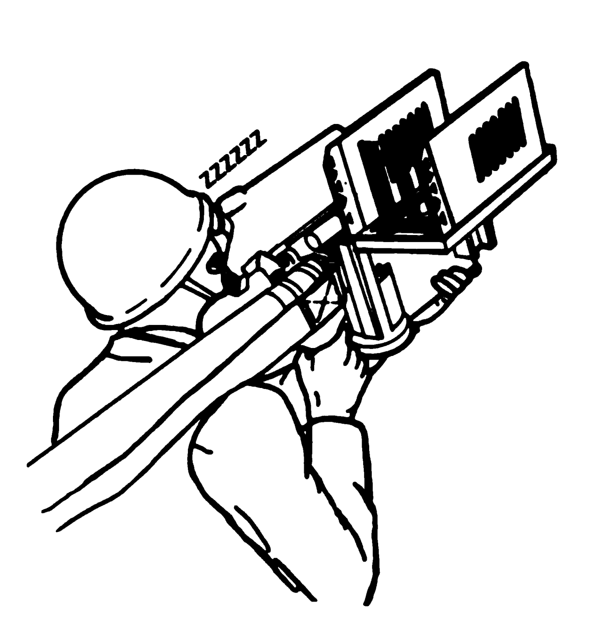
Press the safety and actuator device forward and down until you hear it click.

Weapon warmup occurs within a period of 3 to 5 seconds during which certain components are brought up to the mechanical and electrical condition required for system operation.

The gunner should hear the gyro spinup noise which indicates the system is becoming operational.

IR ACQUISITION

When the target provides sufficient IR radiation to the seeker, acquisition signals will be generated. These signals indicate that the seeker has acquired the target. Two conditions are required for the missile seeker to acquire the target IR radiation.

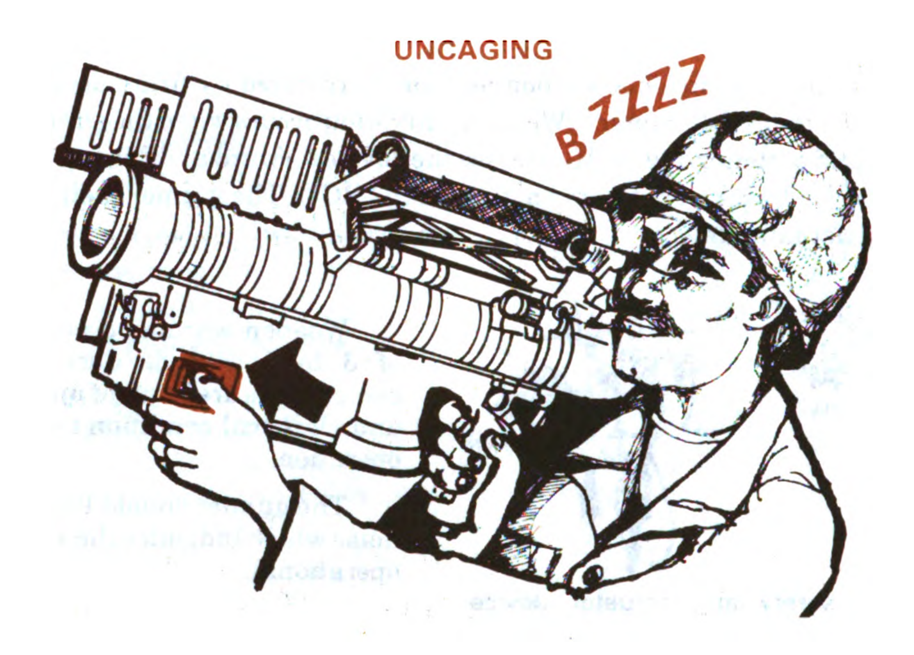


1. The weapon must be activated and pointed at the target.
2. The IR radiation from the target must be strong enough to activate the acquisition indicator circuits.

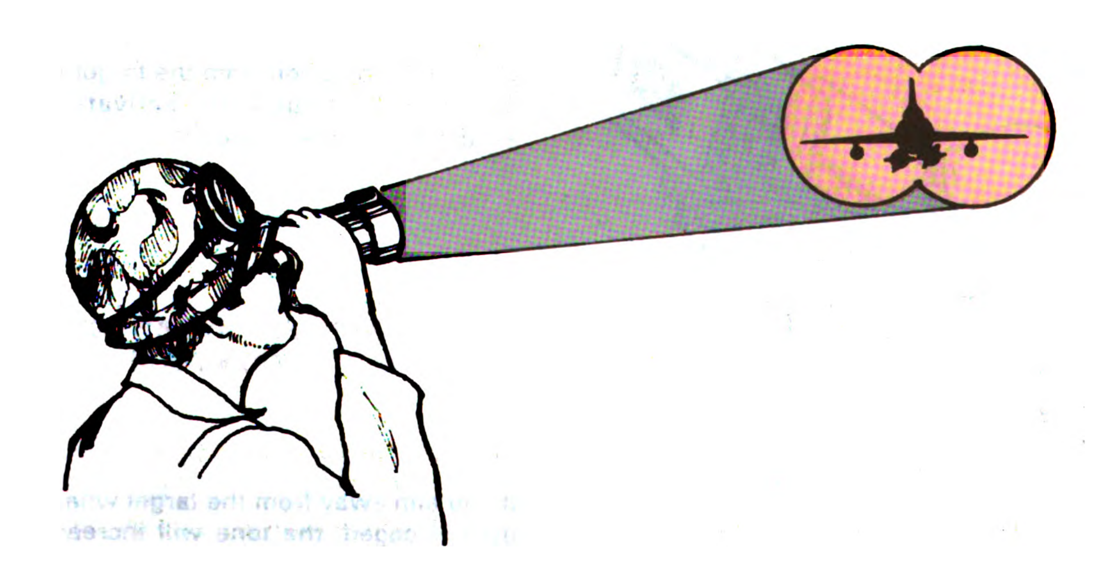
LISTEN FOR A DISTINCT ACQUISITION TONE.

If you aim away from the target when the gyro is caged, the tone will increase or decrease.

UNCAGING

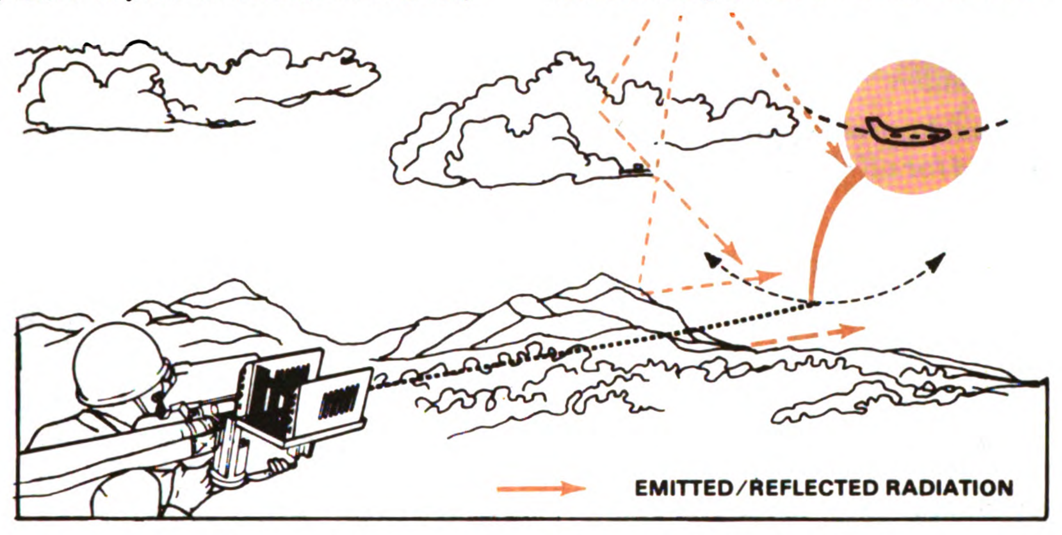


After assuring that the seeker has acquired the aircraft, the gunner presses the uncaging switch with his left thumb, holds it in, and continues to track the aircraft. After he uncages, the IR tone usually gets steadier and louder. This lets the gunner know that the seeker has locked onto the aircraft and is tracking it. If the tone is lost upon uncaging, the gunner releases the uncaging switch and continues to track the aircraft in the range ring until he has acquired the tone. He again presses the uncaging switch.



Note: *The target must be positively identified as hostile prior to firing.*

If IR lock cannot be obtained, the seeker may be locking on the background instead of the target. The sun is an extremely strong source of IR radiation and the seeker may lock on it instead of the target. The sun's IR radiation is also reflected from objects, causing these objects to become secondary sources of background radiation. When the target is approaching through clouds, haze, close to the ground, or is between the gunner and the sun, background lock may occur. When the gunner cannot acquire the target because of the background radiation, one of the following methods should be used.



Sweeping the Target Method. When the target is low on the horizon, sweep the target. Gently swing the weapon in small movements until the IR tone gets stronger. A clear tone should be received when the aircraft enters the range ring on the sweep.

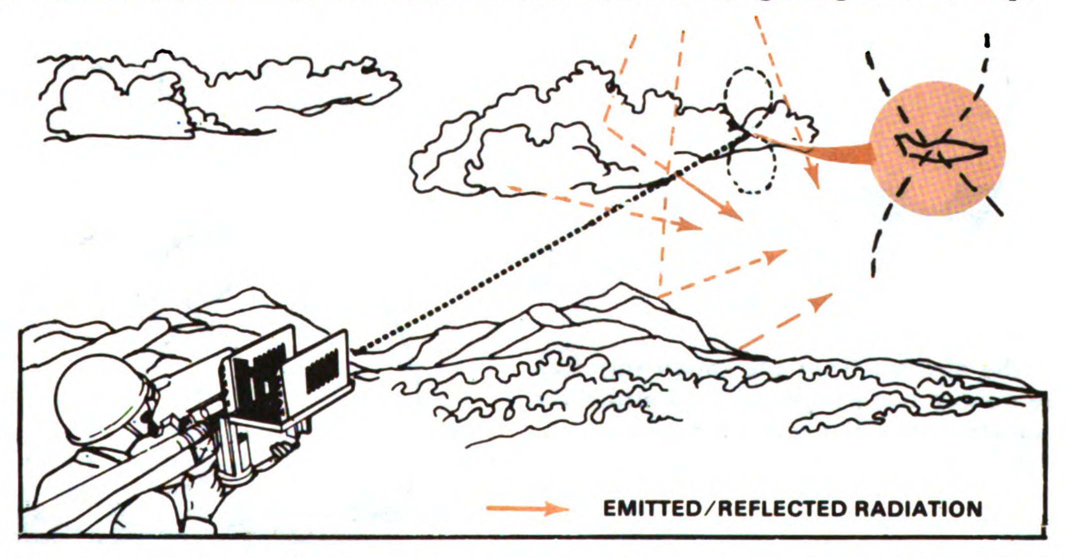


Figure 8 Method. When the target is above the horizon, use the figure 8 method. Move the weapon using the target as a starting point and make two loops as in a figure 8. If you still cannot acquire the target, keep sighting on the target and wait until the IR tone gets stronger.

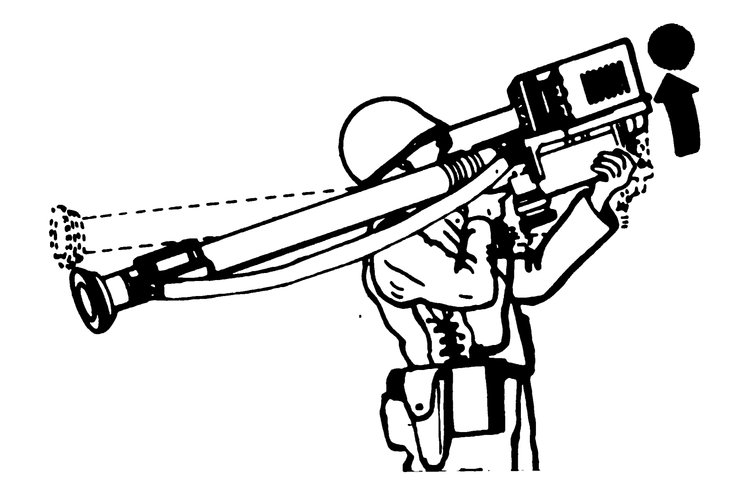
SUPERELEVATION and LEAD

The gunner inserts superelevation and lead.

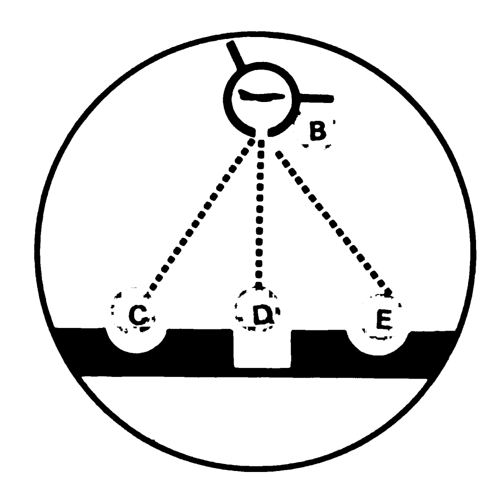
Superelevation. Superelevation is the elevation angle added to the missile line of sight. This angle compensates for the effects of gravity on the missile prior to flight motor ignition.

Lead. Lead is the angle between the point of aim and the moving target. ***Lead is required for all targets, except those fixed-wing targets directly incoming or outgoing.***

To superelevate, you raise the front of the weapon A .



Move the aircraft from the range ring (B) where you've been tracking it to either the *left, center,* or *right* lower reticles (C) , (D) or (E).

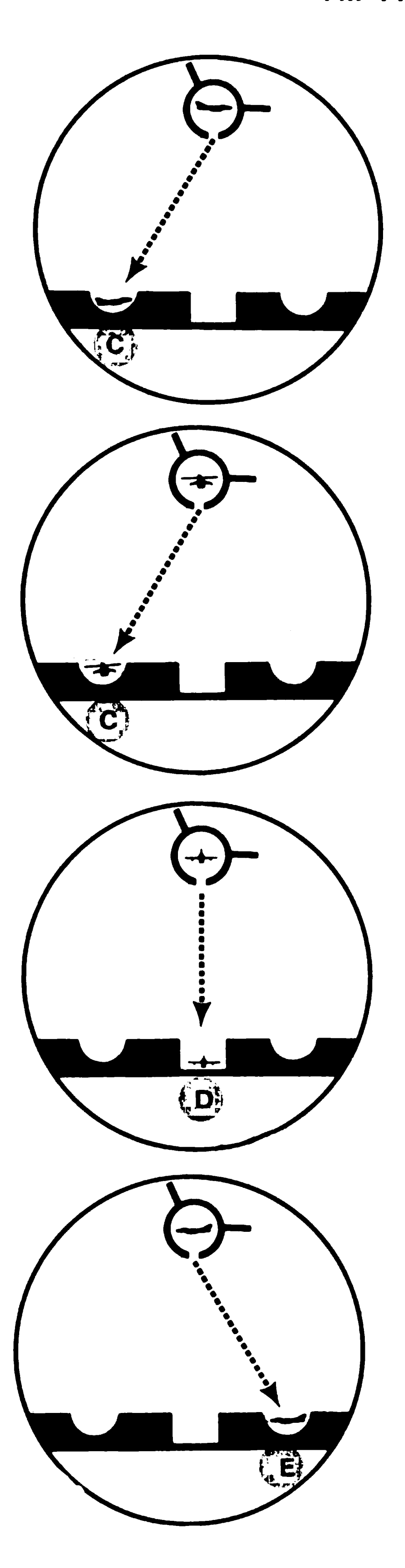


If the aircraft or helicopter comes from the LEFT, or slightly from the LEFT, it is placed in the left reticle (C).

If a helicopter is directly INCOMING or OUTGOING, it is placed in the LEFT reticle (C).

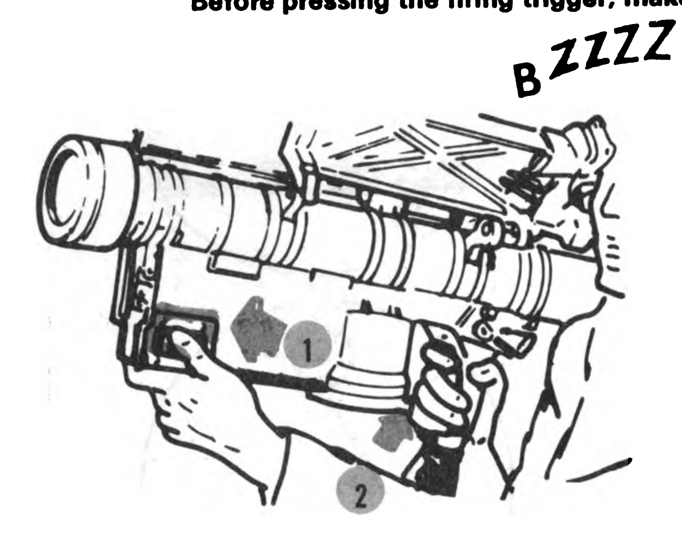
If the aircraft is directly INCOMING or OUTGOING, place it in the CENTER reticle (D).

If the aircraft or helicopter comes from the RIGHT, or slightly from the RIGHT it is placed in the RIGHT reticle (E).



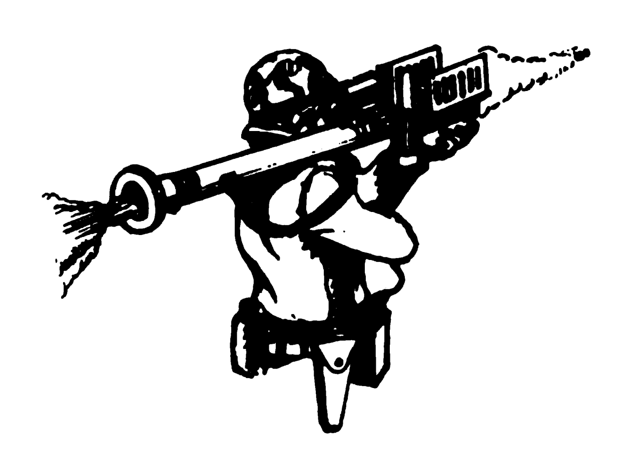
FIRING

Before pressing the firing trigger, make sure that you still hear the tone.



Still holding uncaging switch (1) squeeze and hold firing trigger (2).





Keep tracking target until weapon fires and the missile is launched. Release trigger and uncaging switch 3 seconds after launch.

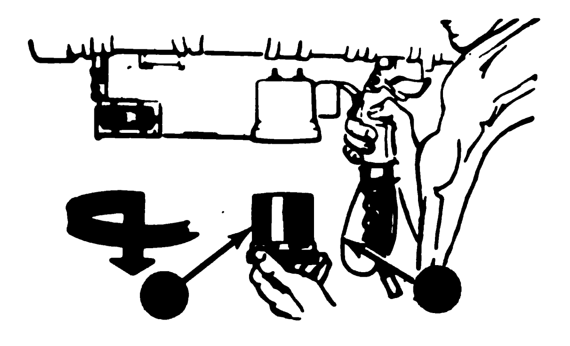
> ***WARNING***
>
> **When firing, HOLD YOUR BREATH until you release the trigger to avoid inhaling toxic fumes.**

POST FIRE PROCEDURES

WARNING

BCU is extremely hot when activated. Grasp it only by heat-insulated cap when you remove it.

Post firing procedures include the following:



1 Remove the expended BCU from the gripstock within 3 minutes to prevent damage to the battery receptable.

2 Remove IFF cable by pulling straight down on the quick release loop attached to the IFF cable connector.

3 **Place expended weapon on the ground. When the tactical situation permits, remove the gripstock assembly from the expended launch tube. It can be reused on another missile-round. The launch tube will then be discarded.**

4 Leave firing site quickly to avoid fire from the enemy.

HANGFIRES, MISFIRES, and DUDS

A hangfire is a delay in the functioning of a weapon-round. It can last up to several minutes. A misfire is a complete failure to fire. If a missile does not fire, the following steps should be taken:

Continue to track the target for an additional 3 to 5 seconds, keeping the firing trigger and uncaging switch depressed. If, after approximately 3 to 5 seconds, the missile has not ejected, release the firing trigger and uncaging switch. Remove the BCU.

WARNING

To remove the BCU, grasp it only by the heat-insulated cap. Do not point the top of the BCU toward the skin, as high-pressure gas may still be escaping. Do not handle the used BCU for 2 hours after it has been removed.

Place the weapon-round on a stand or on the ground. Both ends should be pointed away from personnel and the front end should be elevated (approximately 20°). Leave the firing site without passing in front of or behind the weapon.

Mark the defective weapon's location and then notify the Explosive Ordnance Detachment (EOD) unit. Allow at least 3 hours before you approach it.

A dud is a missile whose flight motor does not ignite. It is ejected from the launch tube assembly, travels a short distance, then falls to the ground. In these cases, mark the location and then call the Explosive Ordnance Detachment (EOD) unit. Remember, the missile is classified and should not be left alone.

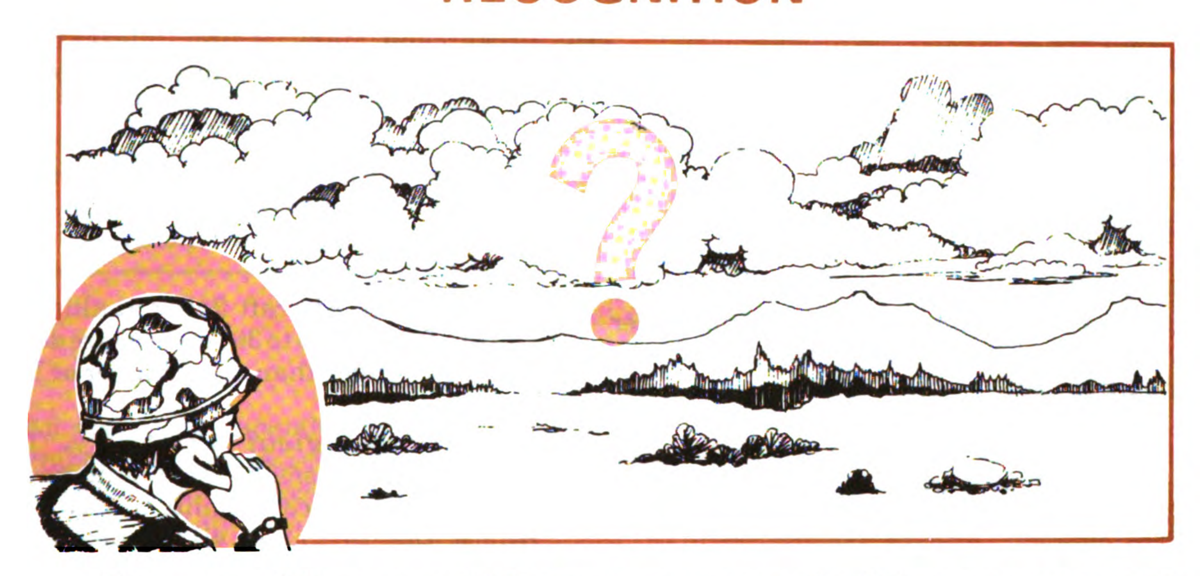
WARNING

For a hangfire, misfire, or dud missile, personnel should evacuate the area around the missile for a distance of not less than 1200 feet. The missile should not be approached for at least 3 hours.



CHAPTER

AIRCRAFT DETECTION, INTERROGATION, and RECOGNITION



To successfully accomplish an engagement, the Stinger team must be proficient in detecting and identifying aircraft. This chapter focuses primarily on the methods and techniques used in detecting aircraft. Because the identification function is an integral part of the engagement sequence, it is mentioned, where appropriate in this chapter, but is not discussed in detail. Aircraft recognition training is covered in TC 44-30. FM 44-18 tells how to apply rules of engagement, which include hostile criteria and weapons control statuses, in making the decision on whether or not to fire at an aircraft.

CONTENTS

AIRCRAFT DETECTION

The first step in a Stinger engagement is visual detection of the target. This may be done by either member of the team. A Stinger team may be warned of an approaching aircraft by the FAAR/TADDS system or the early warning broadcast net. In any case, the target location must be made known to the gunner. When warning of the approach of unknown aircraft is received, the Stinger team can narrow its search sector to the general direction from which the aircraft is coming.

The range at which aircraft may be detected varies with several conditions under which detection is tried. Some of these conditions are:

TERRAIN MASKING

Since Stinger gunners are on the ground, the local terrain will influence the distance at which low-altitude aircraft will unmask, i.e., not be hidden behind a hill or other feature. Terrain mask should be kept in mind when selecting a site.

AIRCRAFT CHARACTERISTICS

The main features of an aircraft that affect detection range are --

Size. The larger the target, the farther away it can be detected. Apparent aircraft size varies with the type of aircraft and the aspect from which it is viewed. A jet fighter flying a course directly toward an observer shows a small profile and can get quite close to the observer before it is detected. The same aircraft on a crossing course has a much larger profile and thus can be detected at a greater range.

Color. The color of an aircraft affects the degree that the aircraft contrasts with the background. Many jet aircraft leave a smoke trail that can be used as an aid in detection at long ranges.

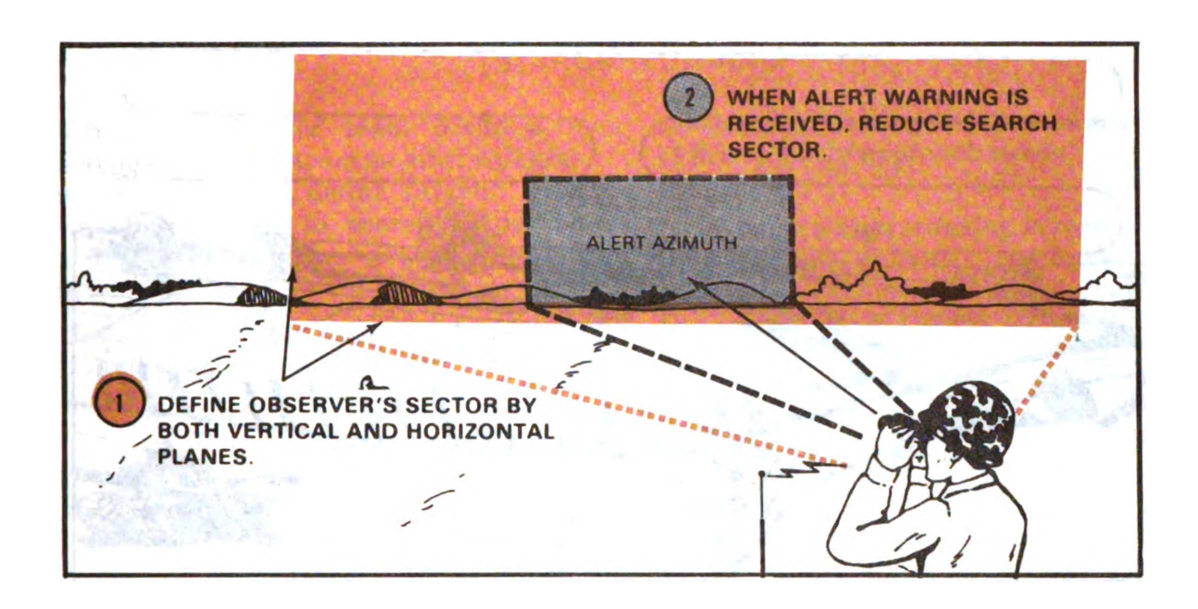
Speed. Aircraft speed affects the visual detection of aircraft. Detection range decreases as target speed increases.

Altitude. Aircraft flying at altitudes of 150 to 1,200 feet (46 to 366 meters) are detected at longer ranges than those higher or lower.

Meteorological Visibility. Rain, snow, dust, fog, smoke, heat shimmer, and haze tend to reduce visibility and so tend to reduce the range of visual detection of aircraft.

Visual Acuity. Observers are required to detect, recognize, and identify small objects at long ranges. Therefore, they must have good eyesight. Their eyes should be rested periodically to prevent fatigue and maintain alertness. Binoculars have little value in detection because they have narrow fields of view. This increases the time required to search a given area of space. Binoculars may help to identify a target after it has been detected.

Search Sector Size. Search sectors should be as small as possible and still have good coverage to both sides of the expected avenues of target approach. When alerted to an approaching target, the search sector should be reduced and concentrated in the general direction of the expected approach.



An observer's capability to detect and recognize aircraft increases as the size of the search sector assigned decreases. Detection is more likely if an observer is assigned responsibility for searching a narrow sector than if he is responsible for searching the entire area surrounding his position. If an alert warning system is supporting the observer, he may be assigned a fairly large sector (e.g., 90°) for general surveillance. When a warning is received, he then narrows his search sector (e.g., 30°) and centers it on the aircraft's approach azimuth (1). Decreasing sector size to less than 30° may not be advisable because of inaccuracies in alert warning system azimuth data. Restricting search to a very narrow sector centered on warning data may cause the observer to miss aircraft if azimuth data are inaccurate by a few degrees. Often observers, using the horizon as a reference, tend to concentrate their search near the horizon and disregard objects high above the horizon. Therefore, when assigning search sectors, the sector should be defined in both horizontal and vertical planes (2).

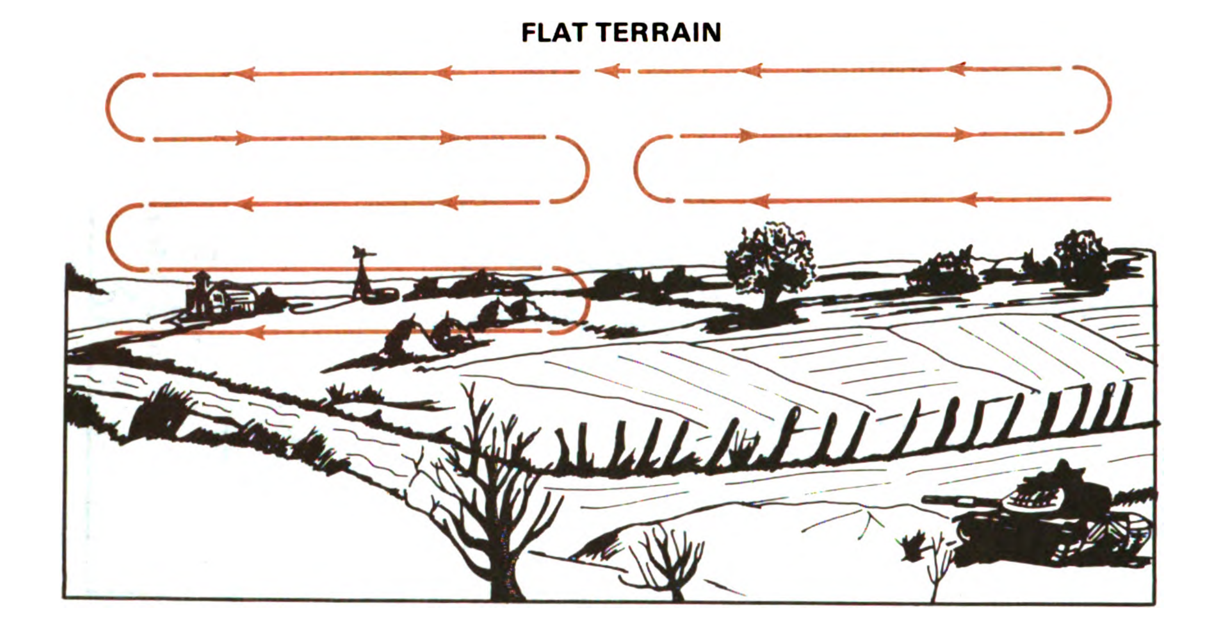
HOW to LOOK

Two techniques are suggested to search for aircraft--one for flat terrain, another for hilly terrain.

In both, the observer should:

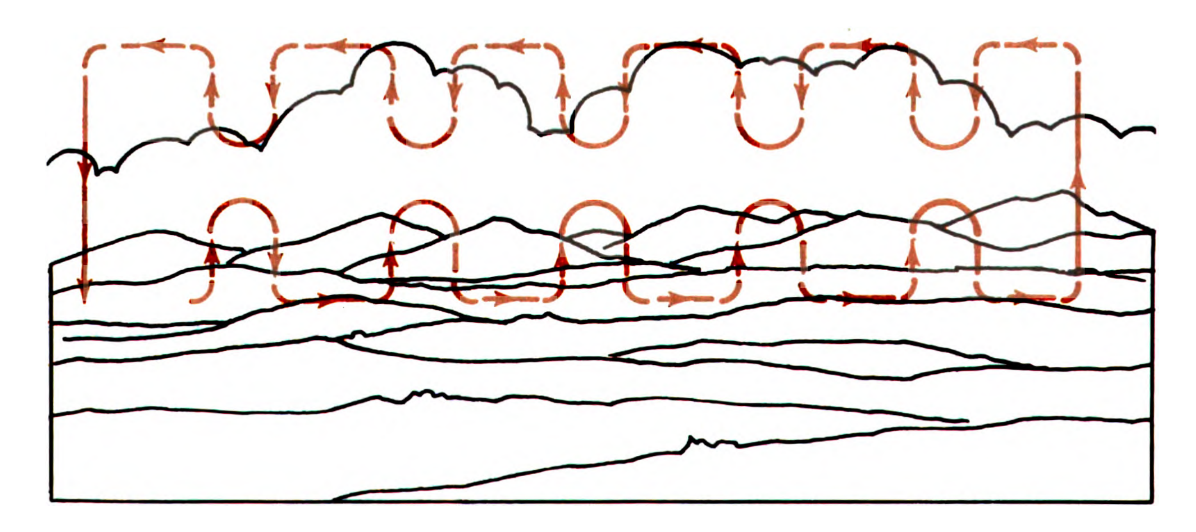
- Frequently focus his eyes on a distant object, such as a cloud or terrain feature. Otherwise, the eyes tend to relax and distant objects become blurred.
- Search the area near the sun by placing his extended thumb over the sphere of the sun. Looking into the sun, without shielding it, causes the eyes to be blinded for a few seconds.
- Squint, if he has trouble focusing at long ranges. Squinting compresses the eyeball, changes its focal length, and makes distant objects come into focus.
- Keep his eyes on the aircraft once he sees it. If he has to look away from it, he notes the direction of the aircraft and moves his eyes away from it when the aircraft is near some object, such as a cloud or a terrain feature, that will guide his eyes back to it.

FLAT TERRAIN



In flat terrain, the observer searches about 20° above the horizon by moving his eyes in short movements across the sky working his way up and across. He continues the scan pattern below the horizon to detect aircraft flying nap-of-the-earth. More detail is registered this way than with a continuous scan of the horizon.

HILLY TERRAIN



In hilly terrain the observer searches the sky using the horizon as a starting point and prominent terrain features as points of reference. He moves his eyes in short movements up the sky, over, then down, continuing this movement across the terrain. He scans in the same pattern below the horizon to detect aircraft flying nap-of-the-earth.

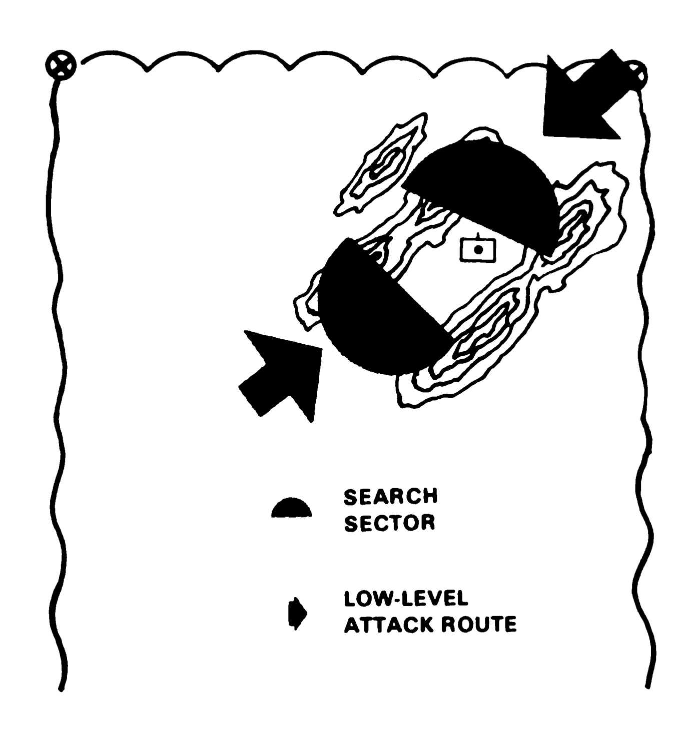
SEARCH SECTORS

When the Stinger team occupies a tactical position, each team member will take turns searching for aerial targets. This allows one member to search while his partner rests his eyes and provides ground security.

Search sectors are arranged to provide all-around coverage of the entire area and overlapping coverage of the assigned sector of fire on likely approach routes.

When an alert warning is received, both team members shift primary search emphasis to the azimuth of approach (with frequent all-around scans) until one member detects the target.

WHERE to LOOK



Stinger teams search for aircraft in their assigned sectors and as prescribed by local standing operating procedures (SOP).

At times, the Stinger team will be assigned a sector of responsibility by the Stinger section leader or the supported unit commander. When two or more teams are defending a unit in position behind the line of contact (LC), the Stinger team normally concentrates its search in its assigned sector and occasionally scans the remainder of the horizon.

In some instances, the terrain may restrict low-level attacks to particular avenues of approach, allowing the search for aircraft to be conducted along these avenues.

At other times, the Stinger team will search for aircraft as specified by local standing operating procedures and as required by the situation. This is common when a Stinger team is defending a convoy and when it is supporting a maneuver unit in contact or moving to contact with the enemy.



A map reconnaissance of the supported unit's direction of movement or area of operations will help to pinpoint areas from which aircraft are most likely to attack the unit. **Mark the far sides of woodlines,** ridgelines, and significant folds in the terrain out to at least 3,000 to 5,000 meters. This is where attack helicopters can lie in wait at the maximum range of their current and later model antitank guided missiles (ATGM). Mark restricting terrain--defiles and narrow valleys--where the unit may be forced to pinch together, becoming lucrative targets for air attack.



When accompanying maneuver units in contact or moving to contact with the enemy, the Stinger team usually concentrates its search for aircraft in the general direction of the enemy ground forces and occasionally searches the entire horizon. Other unit personnel should also be constantly alert to the possibility of attack by enemy aircraft. Again, the team chief marks the route of advance on the TADDS and monitors it and the radio for warning of approaching aircraft.

SOME THINGS to LOOK FOR

Many aircraft have tell-tale signatures which can lead to early detection. Stinger teams should look for such things as:

- **Sun reflection from aircraft canopies or cockpit windows.**
- **Blade flash from rotating helicopter blades.**
- **Smoke or vapor trails from jet aircraft and missile or rockets fired from aircraft.**
- **Dust or excessive movement of tree tops and bushes in a particular area.**
- **Noise from helicopter blades or from jets breaking the sound barrier.**

AIRCRAFT INTERROGATION

WHEN to INTERROGATE

Exactly when to interrogate an aircraft depends upon the weapons control status in effect. The following guidelines apply:

REMEMBER

THE RIGHT TO FIRE IN SELF-DEFENSE IS NEVER DENIED, REGARDLESS OF WEAPONS CONTROL STATUS.

WEAPONS FREE

Challenge upon VISUAL detection.

If you receive an "unknown" reply, proceed with your engagement sequence and activate the weapon. Missile launch is permissible on any aircraft not positively identified as friendly.

WEAPONS TIGHT

Challenge upon VISUAL detection.

If you receive an "unknown" reply, proceed with your engagement sequence and activate the weapon. Do not launch the missile until after positive visual identification is achieved.

WEAPONS HOLD

DO NOT challenge.

Fire only in self defense.

HOW to INTERROGATE

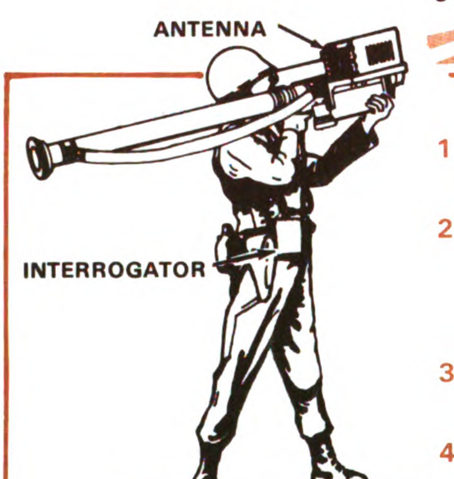
The gunner aims his weapon at the target and centers the aircraft in the range ring. He interrogates the aircraft and listens for the IFF response. The operation starts when he presses the IFF challenge switch and lasts about 2 seconds.



HOW STINGER IFF WORKS

As soon as the potential target is in the range ring, the gunner presses the challenge switch. After triggering, the IFF operation is completely automatic. It's as simple as that.





IFF events occur in this order-

1 Gunner aims at the target and presses IFF challenge switch.

2 The interrogator sends a signal (challenge) by radio to the aircraft to determine its "friend" status. If the gunner has positively identified the aircraft as a "friend," do not challenge.

3 The aircraft transponder transmits a coded reply to the Stinger IFF system which evaluates it for correctness.

4 The IFF system then furnishes an audible signal to the gunner indicating whether the aircraft is a positive friend, possible friend, or unknown.

THE IFF CAN BE USED BEFORE OR AFTER WEAPON ACTIVATION.

IFF TONES

If the correct replies for mode 4 are received, you get a half-second "beep," then a half-second later you get another "beep."

MODE 4 POSITIVE FRIEND — BEEEP (½ Second) — PAUSE (½ Second) — BEEEP (½ Second)

If correct mode 4 replies are not received, the interrogator automatically switches to mode 3 and interrogates again. If the correct replies are received, you get a 1½-second "beeeeeeep."

MODE 3 POSSIBLE FRIEND — BEEEEEEEEEEEEEEEEEEEP (1½ Second)

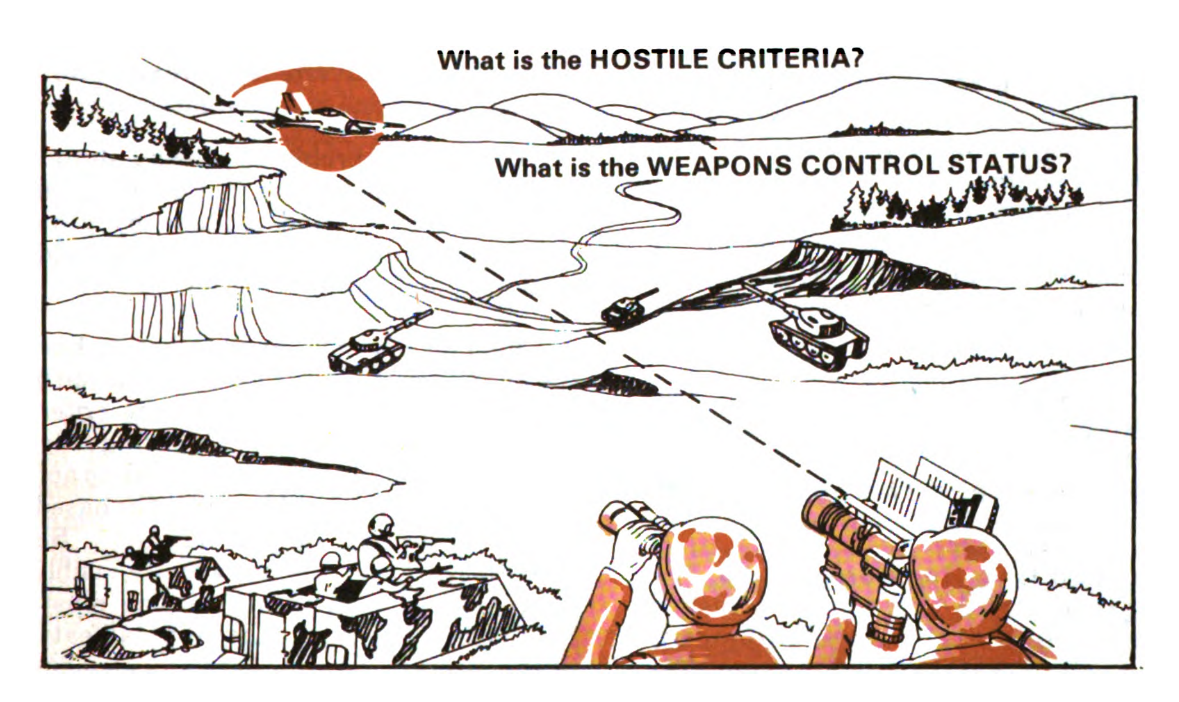
If you get an incorrect reply, you will hear a string of short "beeps" telling you that the target identity is unknown.

MODE 3 UNKNOWN — BEEP BEEP BEEP BEEP BEEP BEEP BEEP — SHORT BEEPS

If no tone is heard when you press the IFF interrogator switch, the IFF system is defective.

IFF SYSTEM DEFECTIVE — NO TONE

AIRCRAFT IDENTIFICATION



Firing a Stinger missile at an aircraft must be in accordance with specific hostile criteria. ***Normally, the responsibility for target identification rests with the team chief.*** The identification must be completed before the team chief can issue a command to engage. The gunner may complete the engagement sequence up to firing, but he WILL NOT FIRE without having first received an order to engage from the team chief. When operating as part of a split team, or if the team chief becomes a casualty, the gunner must assume identification responsibilities.

After an aircraft has been detected, it must be identified as friendly, hostile, or unknown.

If the aircraft belongs to us or one of our allies, it is a friend and must not be engaged. We need them.

If the aircraft belongs to the enemy, it must be destroyed (except under WEAPONS HOLD). However, the right to fire in self-defense is never denied.

If the aircraft is unknown, the engagement decision is based on a WEAPONS FREE status and application of hostile criteria.

Recognition of the aircraft by name or country of manufacture is a start, but is not conclusive. For instance, the Mirage III/V is made in France. However, it is in service in 23 countries in Europe, Middle East, Africa, Australia, and South America. Other aircraft are similarly spread throughout the world, including some made in the United States. Target identification as hostile must be based on visual inspection of the target and its assessment against specific hostile criteria. The exact criteria in use may vary with the tactical situation, from command to command, and in terms of time and space. For example, the SOP may classify as hostile those aircraft that are:

Attacking Friendly Elements. Any aircraft actively attacking the team or supported unit or installations may be identified as hostile. ***The right to self-defense is never denied.***

Responding Improperly to IFF Interrogation. A TAADS unknown disk is based on the failure of an aircraft to properly respond to the FAAR IFF interrogation. The team chief may accept a TAADS "unknown" (foe) disk as a first assumption of hostility. He must then successfully apply at least one more hostile criteria based on visual observation of the aircraft before making a final identification of the aircraft as hostile.

Performing any of the following acts over friendly troops or territory without prior coordination:

- Discharging smoke or spray.
- Discharging parachutists or unloading troops in excess of normal aircraft crew.
- Engaging in mine-laying operations.

Unauthorized or improper entry into an area designated as restricted or prohibited. Care should be exercised in applying this criterion. This is necessary to avoid engaging a friendly aircraft that has been damaged and is returning to the rear of our lines. Also, it may have inadvertently strayed into the restricted area due to a navigational error.

Operating at prohibited speeds, altitudes, or in prohibited directions. The determination of aircraft speed and altitude by ground observers is difficult. Extreme care should be used in applying this criterion.

Bearing the military markings or having the configuration of an aircraft employed by a known enemy nation. This is the criterion most likely to be used by the Stinger team chief and probably the most difficult to apply. Application of this criterion must be based on visual inspection of the aircraft . Since aircraft markings are not usually visible at long ranges, most identifications must be based on recognition of the physical features of the aircraft. To eliminate any element of doubt, the team chief must be capable of recognizing friendly as well as enemy aircraft. (For detailed discussion of aircraft recognition, refer to TC 44-30.)



The ENGAGEMENT DECISION

The mission of the Stinger team is to protect the unit which it is supporting from attack by aircraft. To be successful in this mission, the team members must work together. This chapter ties in the actions and decisions made by the team chief and gunner during the engagement sequence. These actions and decisions must be understood by both team members prior to and during an engagement.

CONTENTS

STINGER TEAM

The basic combat unit is the Stinger team. It consists of a team chief (E-5) and a gunner (E-4). Both are trained as gunners, in communications, and in detection and recognition of aircraft. During periods of intense air activity, both may act as gunners to increase the rate of fire. A basic load of six Stinger weapons (four weapon-rounds and two missile-rounds) is carried by each team during combat operations.

Stinger teams supporting maneuver units provide an additional means of forward area air defense against aircraft attacking at low altitudes.

COMMAND AND CONTROL

The Stinger teams are commanded and controlled by the section chief. The section chief controls his teams in field operations through use of detailed tactical standing operating procedures. This method of control is used because the teams are usually located at long distances from the section chief's command post. Therefore, direct and personal supervision of each team normally is not possible. The link between the section chief and his teams is a tactical radio net. Over this net the section chief maneuvers his teams and obtains information on their status and condition. He also modifies their state of readiness by changing the air defense warning and controls their freedom to fire by use of weapons control statuses and fire control orders. Further details on command and control are found in FM 44-18.

The following fire control orders are used as required by section chiefs and team chiefs:

FIRE CONTROL ORDER	MEANING
ENGAGE	Engage the specified target. This order cancels any previous fire control order which may have been received.
CEASE ENGAGEMENT	Stop tactical activity against a specified target -- prepare to engage another target. This order may be used to reallocate fire against a higher priority target. It can also be used to preclude undesired simultaneous engagement of a target by more than one weapon system.
HOLD FIRE	An emergency fire control order used to stop firing. This order may be used to protect friendly aircraft or in the interests of safety.

TEAM CHIEF

The Stinger team chief is responsible for the decision to engage. He must make the decision based on rules of engagement contained in the unit SOP and with criteria given to him by the section chief.

In addition to identifying the target, he is responsible for:



Selecting the method of engagement to be used.

AND

Selecting the specific target to be fired at.

METHOD of ENGAGEMENT

The method used to engage aircraft depends upon their number. A multiple target raid is a raid by two or more aircraft flying the same course, at the same speed, less than 1,000 meters apart. All other raids are single target raids.

Single Target Raids. All single target raids are engaged using a SHOOT-LOOK-SHOOT technique of fire. This method is the firing of a first missile (SHOOT) as soon as the requirements for an engagement are met, then an evaluation (LOOK) of the first missile to see if it hit the target. A second (SHOOT) missile will be fired if the first does not hit the target or appears to have failed to achieve guided flight.

Upon firing the first missile, the gunner immediately readies another weapon and proceeds to regain visual track and acquire the IR tone of the target. The gunner does not watch the flight of the missile. However, the team chief observes the flight of the missile, makes the kill evaluation and, if time permits, directs the gunner to launch another missile. He may launch a missile himself.

Multiple Aircraft Raids. Multiple aircraft raids are engaged using a SHOOT-NEW TARGET-SHOOT technique of fire. This requires the launching of as many missiles as possible at successive aircraft in the raid. When practical, fire coordination within a team will be on voice command of the team chief. When faced with multiple targets of equal threat, both team members will engage targets. The team chief should direct the gunner to fire at the lead or right hostile target in the prime sector of fire. The team chief engages the trailing or left hostile target. When a multiple target is to be engaged a typical command would be: HOSTILE, SHOOT-NEW TARGET-SHOOT, ENGAGE. Fire will be withheld if friendly and hostile aircraft are closely intermixed. (For further details, refer to FM 44-18 and your unit SOP.)

GUNNER'S FIRING ACTIONS

When the gunner detects the target or receives direction from the team chief on the target, the gunner attempts to acquire the target in the sight. He is assisted by the team chief in acquiring the correct target. When tracking has been established, the gunner continues tracking while waiting for an engagement command. The team chief's engagement command releases the gunner to fire when the gunner decides that the aircraft meets the technical requirements for a successful engagement.

Several essential elements of the engagement sequence must be met before the gunner can properly fire.

- The target is being ***tracked*** smoothly.
- The target has been identified as ***hostile*** or ***unknown.***
- The target has been determined to be in range (see chap 6).
- The weapon has been ***activated.***
- The IR acquisition tone has been ***received.***
- The seeker has been ***uncaged*** and ***IR acquisition tone is clear and steady.***
- The gunner continues to ***track*** the target.
- ***Superelevation*** and ***lead*** are applied.
- The gunner has received the ***engagement command*** from the team chief.

TEAM CHIEF'S ENGAGEMENT DECISION

When the team chief has made a firm decision, he will issue an engagement command to the gunner. The command must include the words "hostile" and "engage," and specify the method of engagement. Typical commands would be:

HOSTILE, SHOOT-LOOK-SHOOT, ENGAGE.

HOSTILE, SHOOT-NEW TARGET-SHOOT, ENGAGE.

The following situations show how the Stinger team chief uses his prescribed rules to make an engagement decision. It is critical that this decision be timely and accurate. To accomplish this, the team chief must thoroughly understand the rules of engagement and control measures applicable to the Stinger system.

I am a Stinger team chief in the following four situations.

SITUATION 1

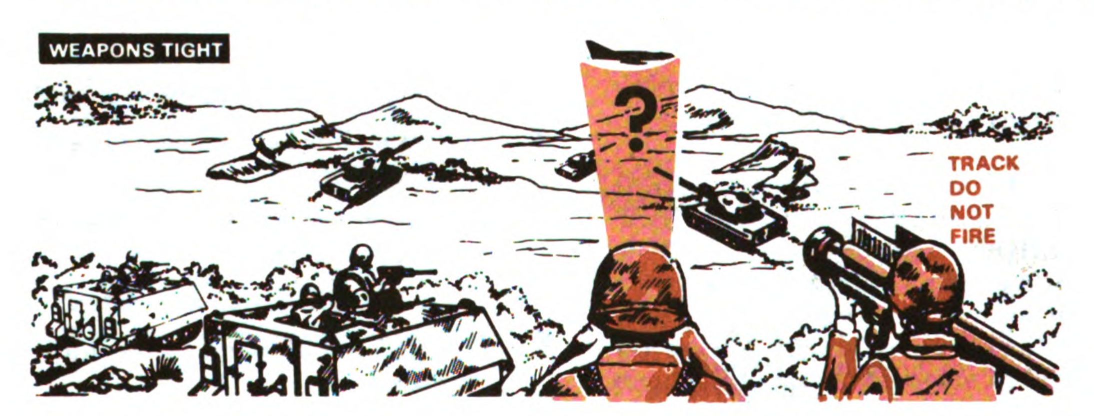
An aircraft is approaching my position very fast and very low. The section leader has announced a weapons control status of WEAPONS TIGHT. My gunner has acquired the aircraft. I cannot visually identify the aircraft at this time. I direct the gunner to challenge with IFF. The gunner challenges and receives an unknown IFF response. (BEEP, BEEP, BEEP, BEEP---.)

Action Taken

I cannot engage the aircraft because I cannot positively identify it as hostile. I do not ignore it, but direct my gunner to continue tracking the aircraft.

Reason

WEAPONS TIGHT requires that I make positive hostile identification before engaging.



As the aircraft comes closer, I positively identify it as a MiG-23. It bears an enemy national insignia.

Action Taken

I order my gunner to engage.

Reason

By visually identifying the aircraft as hostile, I have met the criteria for engagement under WEAPONS TIGHT.

SITUATION 2

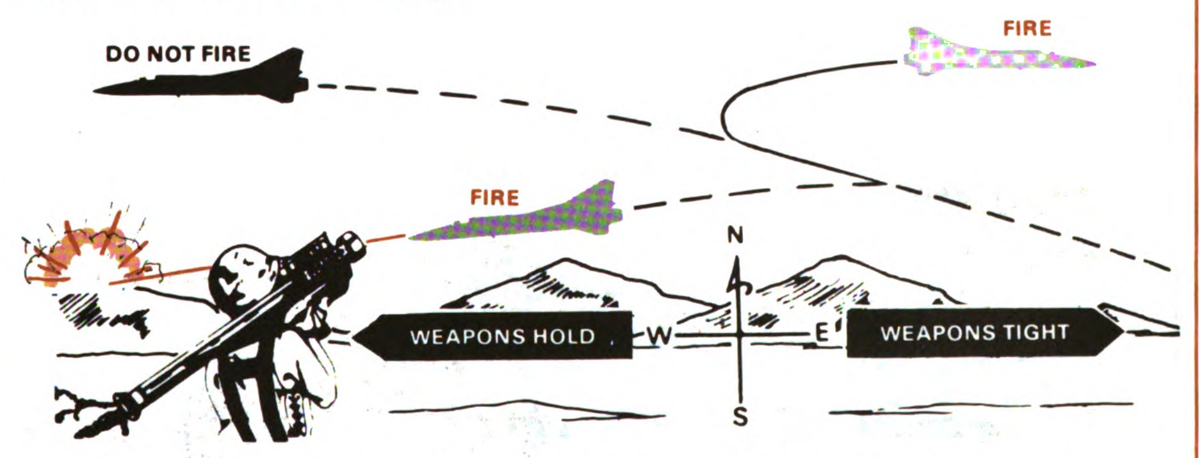
At 1230, I received a message from my section chief. He stated, " WEAPONS HOLD on all jet aircraft flying westbound between 1300 and 1330. WEAPONS TIGHT for all other aircraft." At 1315, a jet aircraft I recognize as hostile approaches westbound. It is coming within range of my gunner's weapon.

Action Taken

I don't engage but continue to observe. My gunner tracks the aircraft and waits for my command to engage. I report the incident to my section chief. If the aircraft changes its heading, so that it is no longer westbound, I will order my gunner to engage.

Reason

Under WEAPONS HOLD, I cannot engage except in self-defense. If the aircraft changes headings, I am then under WEAPONS TIGHT. Since I've already visually identified the aircraft as hostile, I can then engage.



The aircraft continues on the same heading and fires two tactical air-to-surface missiles at the unit I am supporting.

Action Taken

I order my gunner to engage.

Reason

I have the right to engage any aircraft in self-defense. This rule applies not only to an attack on my position, but to the unit I am supporting as well.

SITUATION 3

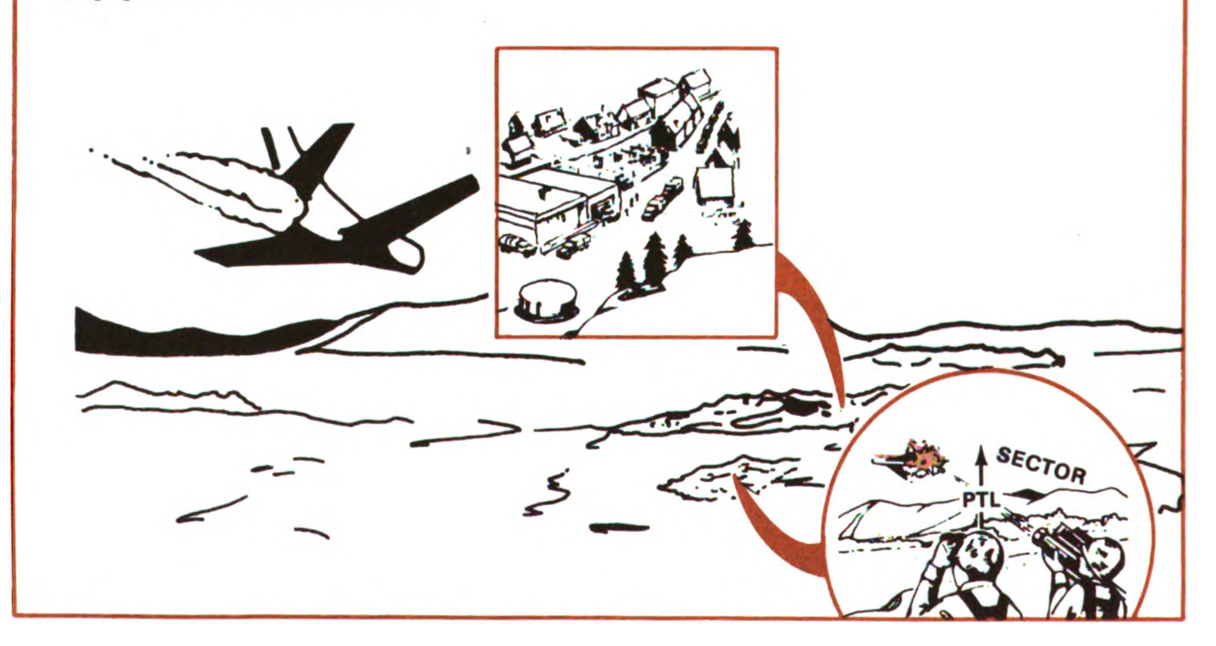
At 1400 my section chief orders me to go to a new position to become part of a four-team defense of a supply depot. Upon arrival, he assigns me a primary sector of fire (PSF) of 0° to 90° and a primary target line (PTL) of 45°. The weapons control status is WEAPONS TIGHT. Three aircraft approach, one at 90°, one at 45°, and one at 20°. All three are at the same range and appear to be moving at the same speed. I visually identify the aircraft at 45° as friendly. I visually identify the aircraft at 20° as hostile. I then turn my attention to the aircraft at 90°. I also visually identify this aircraft as hostile.

Action Taken

I direct my gunner to engage the aircraft at 90°. I then pick up a second weapon system, and engage the aircraft at 20°.

Reason

Since all three aircraft are at the same range and speed, they present an equal threat to the defended asset. The aircraft at 45° is on my PTL and is, therefore, the first aircraft I must look at. Since I visually identify it as friendly and there are other aircraft in the area, I ignore it and look at the second aircraft within my PSF and closest to my PTL. I identify it as hostile. I then look at the third aircraft and identify it as hostile. Since this is a multiple aircraft raid, I order my gunner to engage the aircraft on the right. I pick up a second weapon system and engage the aircraft on the left.



SITUATION 4

I receive a message from my section chief changing the weapons control status to WEAPONS FREE. A jet aircraft approaches my position at a low altitude and high speed. I direct the gunner to challenge the aircraft on detection. He receives an unknown audible signal. The aircraft is still too far out to be visually identified.

Action Taken

I order my gunner to engage and continue my attempts to visually identify the aircraft while the gunner goes through the engagement sequence. I visually identify the aircraft as hostile. I direct the gunner to fire.

Reason

I was authorized to order the engagement because WEAPONS FREE means I should engage aircraft not positively identified as friendly. Since there were no other aircraft in the area, I continued to watch the aircraft until I could visually identify it. Had there been other aircraft in the area, I would have directed my attention at another aircraft. The gunner would then have attempted to visually identify the aircraft before firing. The missile was launched only after the aircraft was identified as not friendly. If I had identified the aircraft as friendly after the order to engage was given, I would have called out, "CEASE ENGAGEMENT."





ENGAGING AIRCRAFT

The speed of modern aircraft is such that the time allowed for completing an engagement may not be more than 10 to 20 seconds. To accomplish all of the tasks required for a successful engagement in this short time requires a smooth, rapid, and almost automatic response by the gunner to every engagement situation. To obtain this type of response requires a set of rules and procedures which can be learned to the point that they can be applied automatically.

CONTENTS

Previous chapters have dealt with the subjects of detecting and identifying aircraft and how to handle and operate the Stinger weapon. This chapter outlines firing techniques necessary to engage aircraft. For the engagement to be successful, these additional decisions must be made:

A. Determine if the aircraft is a jet or propeller-driven aircraft.

B. Activate early enough for target engagement.

C. Determine if the aircraft is an incoming/outgoing or crossing target.

D. Launch the Stinger missile to engage the aircraft within Stinger's range.



TECHNIQUES of FIRE

Stinger team members must make certain decisions that make up the Stinger weapon firing technique. These decisions are combined with other mechanical operations to complete the engagement process. Stinger team members must make the following decisions:

A. Determine if the aircraft is a jet or prop.

For Stinger engagement purposes, aircraft have been placed into two categories:

JETS — This category includes all jet aircraft, regardless of size or mission.

and

PROPS — This category includes all other types of aircraft, such as propeller-driven aircraft and all helicopters.

This determination should be made by the team chief and should come as early in the engagement sequence as possible.

REMEMBER

For Stinger engagement purposes, there are only two types of aircraft:

JETS and PROPS

B. Determine when to activate the weapon.

Upon detection, a decision must be made immediately by the team chief as to whether or not the aircraft is a potential threat. If its direction of flight indicates that it will penetrate the defended area, the gunner issues an IFF challenge. If the aircraft fails to correctly respond to the IFF challenge, it is considered a potential threat. The team chief orders the gunner to activate the weapon at this point.

For slow-moving targets, or targets detected at extremely long ranges, the 45-second life of the BCU may expire prior to launch. The gunner will be cued to this event by a noticeable loss in prelaunch power in the weapon. A significant noise level decrease in the IR tone and gyro spin will also take place as the BCU reaches its life limit. If a BCU is expended prior to launch, the gunner merely inserts a new BCU and resumes the engagement sequence. The removal and insertion of a BCU can be accomplished in a few seconds.

By following this procedure of activating when the aircraft is judged to be a potential threat, a few BCUs may be expended. However, few if any targets will escape engagement.

ACTIVATE RULE

ACTIVATE WHEN THE AIRCRAFT APPEARS TO BE PENETRATING THE DEFENDED AREA AND FAILS TO CORRECTLY RESPOND TO AN IFF CHALLENGE.

C. Determine if the aircraft is an incoming/outgoing or crossing target

Once the aircraft is detected, the weapon is sighted so that the aircraft's image is alined within the range ring of the weapon sight. Tracking the aircraft in the proper stance will help the gunner determine whether the aircraft is on an incoming/outgoing or crossing path. The gunner assumes a proper stance by stepping directly toward the target with his left foot and leaning into the weapon. In this position, if the gunner has any horizontal movement of his arms or upper body as he tracks the target, then the target should be considered crossing. If there is a lack of any horizontal movement, then the target should be considered incoming/outgoing. Also indicative of an incoming/outgoing aircraft is any vertical movement of the gunner's arms or upper body.

REMEMBER

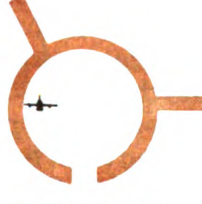
- If the gunner has any horizontal movement of his arms and upper body while tracking an aircraft, then the aircraft is a crossing target.
- If there is NO horizontal movement, the aircraft is an incoming/outgoing target.

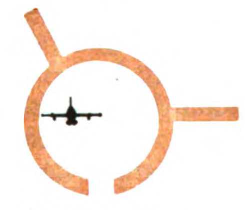
D Determine when to launch the Stinger missile.

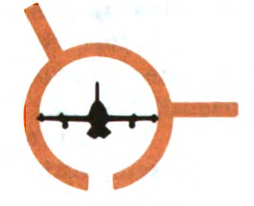
When to launch is the most critical decision made by the Stinger gunner. He must evaluate the target and determine if the target is within the Stinger missile's range. The type of aircraft (jet or prop) and the flight path (incoming/outgoing or crossing) will determine what rule will be used for the launch decision. By applying the specific rule for the type and flight path of the aircraft, the Stinger gunner can be assured that he will fire within the effective range of the missile.

INCOMING/OUTGOING JET AIRCRAFT


1/5 range ring


1/4 range ring


1/2 range ring


1 range ring

For ***incoming/outgoing*** jet aircraft, the launch decision is based on a range ring measurement. The gunner moves the weapon so that the aircraft's image is within the range ring of the sight. He then evaluates the size of the aircraft image relative to the width of the range ring. For example, if the aircraft's size within the range ring is approximately one-half the size of the range ring measured across, then the aircraft is at 1/2 range ring. A helpful hint in estimating aircraft size within the range ring is to place the aircraft at the inner left (or right) edge of the range ring before making a size estimate.

The gap at the bottom of the range ring is also used to measure range ring size. This gap measures 1/5 the size of the range ring. When an aircraft fills this gap, it is at 1/5 range ring.

To determine when to launch the missile at an incoming/outgoing jet, the gunner tracks the jet and makes continuous size estimates. When the jet reaches a specified range ring size, it is considered to be within range of the missile. This is the earliest point at which the gunner may launch. He is also given a second range ring measurement to indicate when he is to hold fire on the jet.

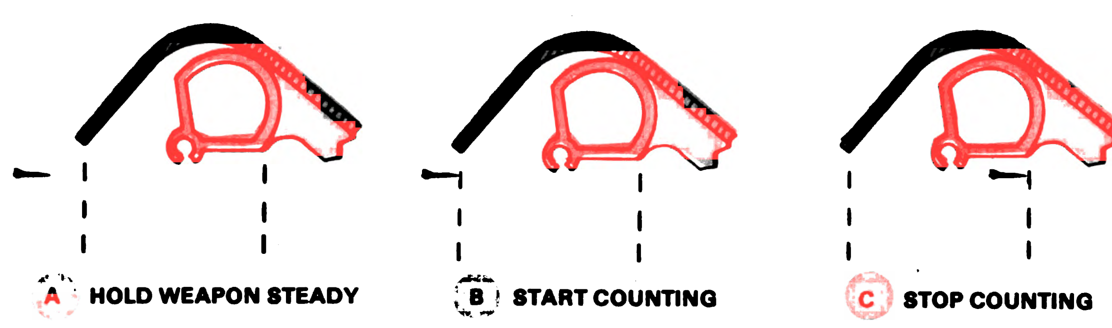
NOTE

The actual range ring measurements used in determining when to launch at incoming jets are classified, and are contained in (C) FM 44-1A.

INCOMING/OUTGOING JETS

When to launch the missile at incoming/outgoing jet aircraft is based on the RANGE RING MEASUREMENTS RULE

CROSSING JET AIRCRAFT



For ***crossing*** jets, the launch decision is based on a time count rule. The gunner positions the weapon sight slightly forward of a crossing jet image, then holds the weapon stationary. He waits until the jet's nose reaches a fixed point within the sight. When it reaches this fixed point, the gunner begins counting off in seconds, "one thousand one, one thousand two, . . ." He watches the jet travel horizontally to another fixed point within the sight. If the jet's nose reaches the second fixed point ***before, or at the time that the specified second is counted off,*** then the jet is within the missile's range. The gunner can launch the missile. However, if the jet takes ***longer*** than the specified time to travel from one fixed point to another, then the jet is beyond the missile's range. The gunner must not fire.

The following example using a hypothetical time count rule is offered for illustration purposes only. Assume that the time count rule specifies, "Launch at a crossing jet if it travels from one edge of the weapon sight to the opposite edge in less than 4 seconds." Consider the gunner engaging a jet crossing from left to right. He positions the weapon sight slightly to the right of the crossing jet, then holds the weapon steady Ⓐ. He waits until the jet's nose reaches the first fixed point—the left edge of the weapon sight Ⓑ. When the jet reaches this point, the gunner begins counting off, "one thousand one, one thousand two,. . ." If the jet's nose reaches the right edge ***before, or at the moment*** the gunner counts off "one thousand four," the jet is within the missile's range Ⓒ. The gunner can launch the missile.

However, if the jet ***has not*** reached the right edge by "one thousand four," it is beyond the range of the missile. The gunner must not fire.

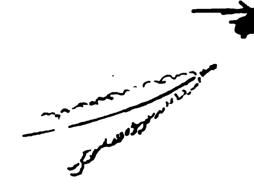
NOTE. *The tail of the aircraft may be used instead of the nose in this procedure. However, only one aircraft section—nose or tail—must be used throughout the procedure.*

NOTE

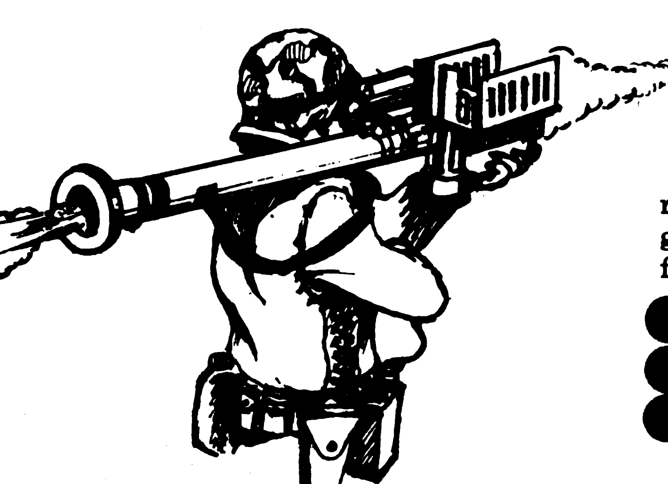
Refer to (C) FM 44-1A for the actual fixed points and the number of seconds (Time count rule) used in determining when to launch at crossing jets.

CROSSING JETS

When to launch the missile at crossing jet aircraft is based on the TIME COUNT RULE.



PROPELLER AIRCRAFT
(INCLUDES ALL HELICOPTERS)



For ***prop*** aircraft, no time count rule or range ring measurements are used. The gunner can launch the missile as soon as the following are obtained.:

- **Weapon activation.**
- **Positive hostile ID.**
- **IR acquisition lock-on.**

STINGER LAUNCH RULES

FOR JETS:

INCOMING/OUTGOING — **LAUNCH WHEN THE JET IMAGE IS WITHIN THE PROPER RANGE RING SIZES.**

CROSSING — **LAUNCH IF THE JET MEETS THE TIME COUNT RULE CRITERIA.**

FOR PROPS: LAUNCH WHEN (1) WEAPON IS ACTIVATED (2) A POSITIVE HOSTILE ID IS MADE (3) IR ACQUISITION LOCK-ON IS OBTAINED.

The ENGAGEMENT SEQUENCE

The techniques of fire are combined with other weapon operations discussed in chapters 3 and 4 to complete the engagement sequence. The following section outlines a basic sequence of events for engagement of jet and prop aircraft. The sequence of events places events in the order that they usually occur, but is not rigid. For example, determining aircraft type (jet or prop) and identification may take place at any time prior to launch. Also, certain actions, such as tracking and determining whether the jet is incoming or crossing, are done continuously throughout the engagement sequence.



DETECT THE AIRCRAFT

This is done by either the team chief or the gunner. It may be prompted by a TADDS or radio command net early warning.

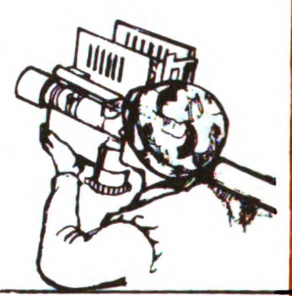




SHOULDER THE WEAPON AND BEGIN TRACKING

In this step, the gunner shoulders the weapon, unfolds the antenna, removes the end cap, raises the sight, and connects the IFF cable (if these actions had not been previously done). He moves the weapon so that the aircraft's image is placed within the range ring and then begins tracking the target.







INTERROGATE THE AIRCRAFT

The gunner interrogates the aircraft. The team chief will consider an "unknown" reply along with the aircraft's direction of flight in determining whether the aircraft poses a threat to the defended area.

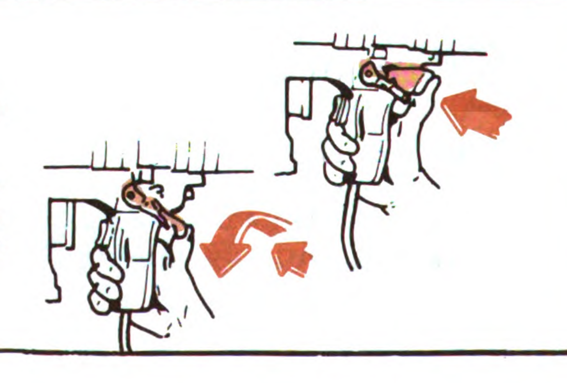




ACTIVATE THE WEAPON

The gunner activates the weapon upon command of the team chief.

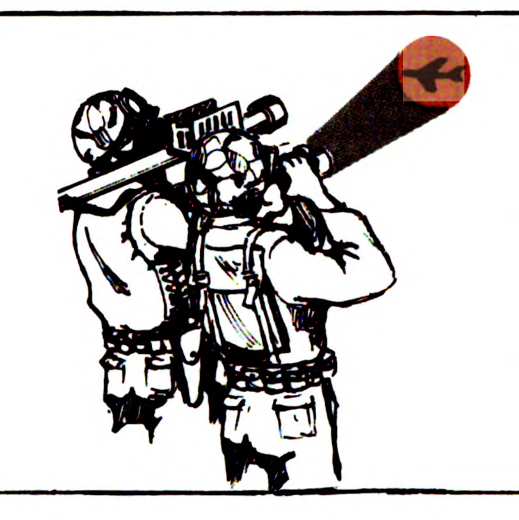
ACTIVATE WHEN THE AIRCRAFT APPEARS TO BE PENETRATING THE DEFENDED AREA AND FAILS TO CORRECTLY RESPOND TO AN IFF CHALLENGE





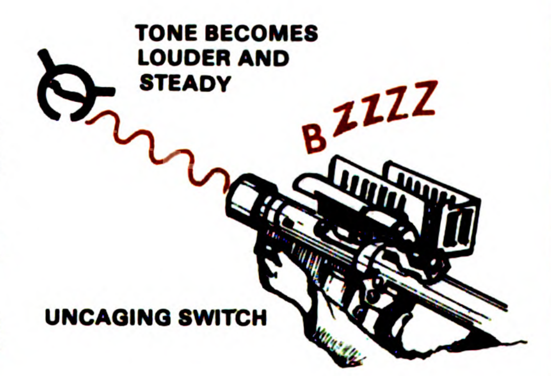
5 IDENTIFY THE AIRCRAFT

The responsibility for identifying an aircraft as hostile or friendly rests with the team chief. He must make this decision as soon as possible within the engagement sequence, but always prior to launch. Identification must be made visually, by applying specific hostile criteria (see chap 4).



6 CONTINUE TO TRACK THE TARGET AND LISTEN FOR AN IR ACQUISITION TONE. TEST FOR SEEKER LOCK-ON BY PRESSING DOWN ON THE UNCAGING SWITCH AND HOLDING IT IN THIS POSITION.

- If the signal is strong enough for seeker lock-on, the tone will become louder and steadier.
- If the tone is lost, release the uncaging switch and try again.
- If you cannot lock on the target, try the "Sweeping the Target" or the "Figure 8" methods (see chap 3).
- Remember, you must have IR acquisition lock-on for all targets before you can fire at them.



7 DETERMINE IF THE AIRCRAFT IS A JET OR PROP.

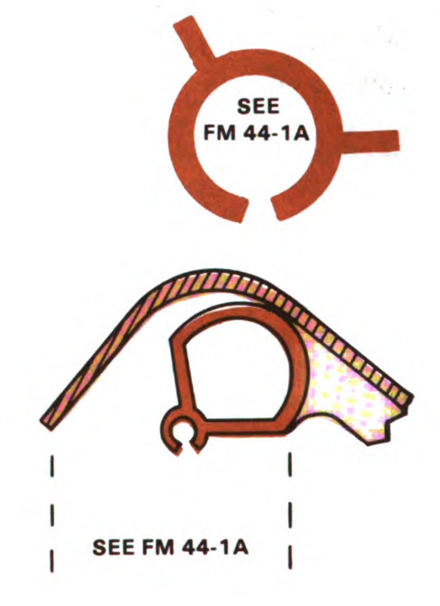
For Stinger engagement purposes, there are only two types of aircraft: jets and props. For props, skip steps 8 and 9.

8 FOR JET AIRCRAFT ONLY, DETERMINE WHETHER THE JET IS AN INCOMING/OUTGOING OR CROSSING TARGET.

For jets, this decision will determine which launch rule is to be used. The gunner's horizontal body movement will aid him in determining whether the jet is on an incoming/outgoing or crossing flight path. If there is any horizontal arm or upper body movement, then it is crossing. The lack of any horizontal movement indicates that it is incoming/outgoing. Any vertical movement is also indicative of an incoming/outgoing target.

9 FOR JET AIRCRAFT ONLY, DETERMINE IF THE TARGET IS WITHIN THE STINGER MISSILE'S RANGE.

Apply the proper launch rule for an incoming or crossing jet to determine if the jet is within the Stinger missile's range.



LAUNCH RULES, *JET AIRCRAFT*

INCOMING — Launch when the jet image is the proper size within the range ring.

CROSSING — Launch if the jet meets the time count criteria.

10 INSERT SUPERELEVATION AND LEAD. LAUNCH THE MISSILE.

Apply superelevation and lead for all aircraft by placing the aircraft image in the proper superelevation and lead reticle. This is applied in the same manner for both types of aircraft, jets and props, with one exception—*Incoming helicopters are to be placed in the left reticle.* Remember, for props, the launch rule states:

LAUNCH RULE, *PROPS*

Launch when the weapon has been activated and a positive hostile ID and IR acquisition lock-on are obtained.



CHAPTER

STINGER TEAM OPERATIONS

The Stinger team, because of the rapid pace of mobile warfare, spends a great deal of time moving, communicating, positioning, and repositioning. These and other tasks are performed under tactical conditions. This chapter provides guidelines on those operations and activities which will assist you in performing your mission.

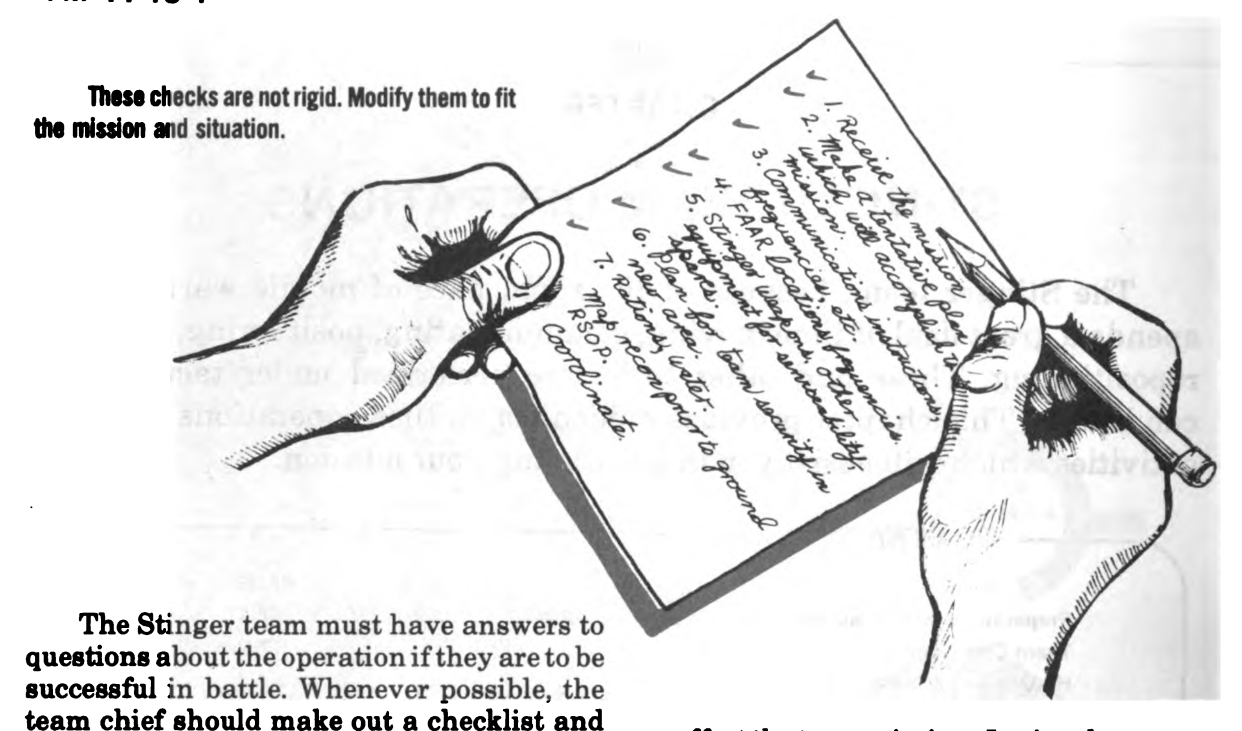
CONTENTS

PREPARATION--Key to Success

For the Stinger team to fight, it is necessary to make certain preparations. The team chief must get answers to questions such as:

- ✓ Who does the team support?
- ✓ To whom does the team report?
- ✓ What is the call sign and frequency?
- ✓ Where is FARR? What is its frequency and address code?
- ✓ What is the communications schedule?
- ✓ What are the security arrangements for the team?
- ✓ What is the threat (air, ground)?
- ✓ What is the weapons control status and state of alert?
- ✓ Where does the team mess and refuel?
- ✓ What is the sign and countersign?
- ✓ What are the special instructions, if any?
- ✓ How will expended missiles be resupplied?
- ✓ When and where will the IFF interrogator be reprogramed?

Modify the list to fit the mission/situation.



These checks are not rigid. Modify them to fit the mission and situation.

The Stinger team must have answers to questions about the operation if they are to be successful in battle. Whenever possible, the team chief should make out a checklist and attempt to find the answers.

The team chief may receive the mission either orally or in writing. The team chief should remember the details which directly affect the team mission. Jotting down some of the information may assist you to remember some of the details. If some important information affecting the mission is vague, ask questions about the matter.

TEAM CHIEF PLANNING

The team chief should make a tentative plan for operation of the team. Normally, a team chief is given specific instructions by the section chief or sergeant, such as "Accompany company team A (indicated by map or by pointing) as soon as possible. Occupy this position at coordinates 86350115. Your team will be close to the 3d platoon on this knoll. The weapons control status is WEAPONS FREE. Check the position on the ground for a good primary and alternate positions. Be prepared for air attack at any time as you move up with the troops. I'll come back and check your position later."

Equipment must be checked for completeness and proper functioning. If changes are required, such as radio frequency change, make sure they are done at the proper time. Sufficient rations and water must be acquired, etc.

The team chief should check his map frequently to make sure he knows where he is going to be positioned and how he is to get there. After receiving the verbal or written order from the section chief, the team chief briefs the gunner on the new operation. The team chief makes sure that the gunner receives all necessary information to accomplish the mission. The soldier does a better job if he knows the situation and is kept informed.

When ordered to move out, the teams go to their designated locations and effect liaison with the commander of the supported or nearest unit. The team chief explains the team mission and touches base on communications, ammunition resupply, refueling, and rations. The team chief should coordinate with other small unit leaders for positioning (night and day), security, etc.

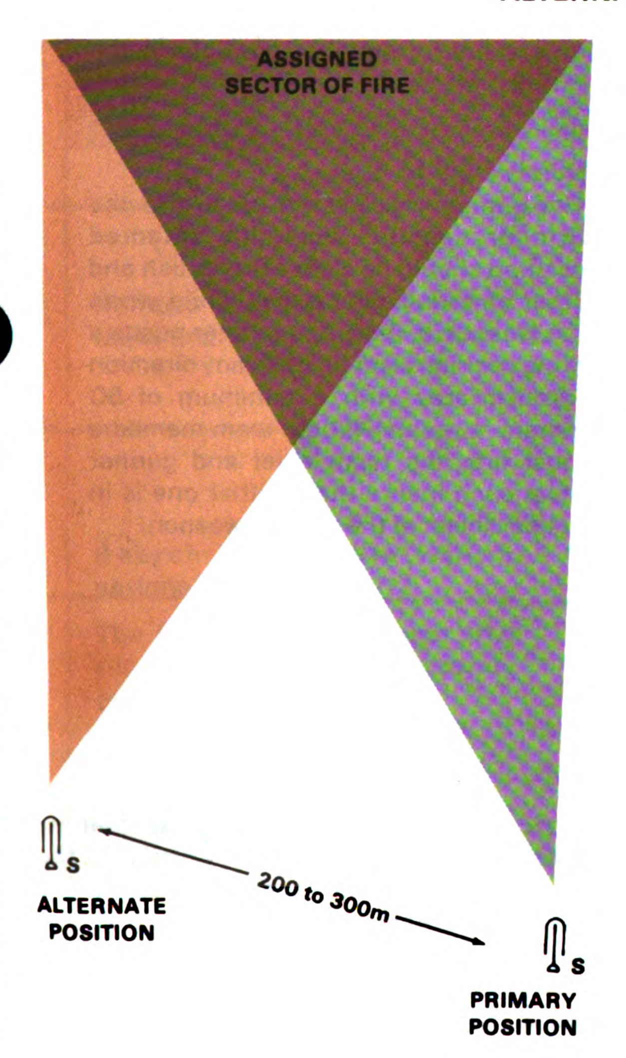
HOW to SELECT a POSITION

Upon arrival of the team at the designated location, the gunner readies his equipment for action. The team chief selects the best firing position within the area selected by the section chief. This site is the team's primary position.

TERRAIN EVALUATION

Terrain evaluation is a continuous process. Mission accomplishment is the prime consideration in site selection. Cover, concealment, and camouflage should also be considered when a choice of sites is available. When selecting positions, give particular attention to unobstructed fields of fire, masking clearance, and backblast area. Terrain features which present a masking problem for employment of Stinger are evaluated for height, distance, and direction from the firing positions. The team chief attempts to select a position which lessens the effect of terrain masking.

ALTERNATE POSITION



The smoke signature of the Stinger missile and backblast can be expected to reveal the team's position during an engagement. After an engagement in forward areas, the team must quickly move to an alternate position. In rear areas, where the threat of ground/artillery fire is remote, the need to move as quickly to another position is not as great. Alternate positions need not and should not be far from the primary position. An alternate position should be at least 200-300 meters from the primary position. The alternate position covers the same sector of fire as the primary position.

Time permitting, routes into and out of these positions must be reconnoitered and selected. The routes should afford cover between positions.

In choosing between available positions, usually advantages and disadvantages must be weighed one against another. When compromises are necessary, how well the team can do its mission at the position is the determining factor.

Use the Position Selection Checklist when picking Stinger positions.

POSITION SELECTION CHECKLIST

- [ ] Good observation and fields of fire
  Positions should ideally have at least 5 km of observation and all-around fields of fire. At least, the gunner must have good fields of fire along the most probable avenues of approach of hostile aircraft.

- [ ] Accessibility for team vehicles
  The position should be easy for the team vehicles to move into. Concealed routes are necessary to rear and flanks for rapid shifting of position.

- [ ] Security from ground attack
  Team positions must have protection against ground attack. Two main factors to think about when positioning Stinger are--

  - Position teams within or near friendly units for security.
  - Protect the team from enemy ground fires. Masking between the position and the enemy hides the position from enemy ground observation.

- [ ] Communications
  Positions selected must allow teams to communicate effectively. Wherever possible, direct line of sight for team communications must be obtained. If you can't communicate from your position, the position is unsatisfactory.

- [ ] FAAR
  Stinger team positions should be located to receive FAAR early warning information. The TADDS is emplaced with as near a line of sight as possible to the FAAR.

- [ ] Safety from backblast
  The gunner must stand up to fire the Stinger missile. Thus, his selected position should be clear of dry brush and other materials which may ignite when the weapon is fired. The gunner needs a firing position clear to fire in any direction (circular area with a minimum of 50 meters in radius). If both team members must fire, the team chief and gunner must each insure that neither one is in the backblast of the other's weapon.

HOW to OCCUPY a POSITION

The primary task is to select the best firing position within the area assigned by the section chief and ***become operational.*** Once a position has been selected for a Stinger team, movement to it and initial occupation are as discussed in FM 44-18. The first priority in occupying a position is preparing weapons for action. The Stinger team must occupy its position as fast as possible. Next, the physical security of the position must be improved as required. The extent to which the team prepares and improves a position will vary according to the mission, the length of stay, and the danger from enemy fire. Use the Position Occupation checklist when occupying a position.



POSITION OCCUPATION CHECKLIST

- ☐ **Check local security.**
- ☐ **Prepare weapons for firing.**
- ☐ **Establish communications with section headquarters and with the supported unit.**
- ☐ **Orient TADDS and plot team position on it.**
- ☐ **Establish FAAR netting (line-of-sight).**
- ☐ **Prepare additional weapons as required.**
- ☐ **Prepare field fortifications (prone/foxhole positions) and camouflage for team members.**
- ☐ **Work on alternate positions as time allows.**

The exact sequence of actions may vary between teams and team members depending on the tactical situation. However, these guidelines should be used for a hasty occupation.

HASTY OCCUPATION

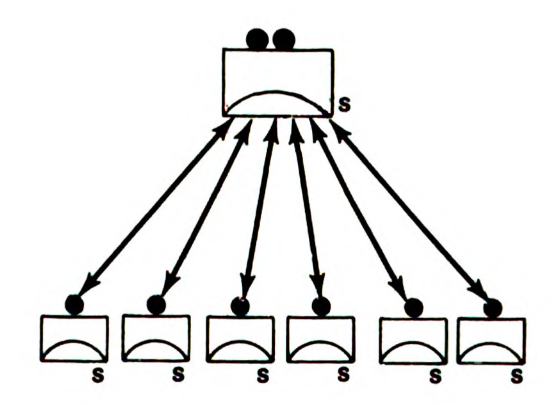
GUNNER	TEAM CHIEF
Remove weapons from ready racks and ready them for action.	**Check security.** Make sure your position is not out in the open and exposed to enemy ground observation or fire. Establish contact with supported unit. (Section command net.)
Search for targets within assigned search sector. The team chief and gunner take turns searching and improving position.	**Conceal vehicle.** Hide the vehicle and trailer close to the position. Continue to monitor the radio. **Establish communications.** Place the TADDS on the ground and orient it. Plot your position on it. Establish communications with the supported unit as required by your unit tactical SOP.
	Prepare additional weapons for firing as required.

Construct a prone position.
Position improvement continues while the position remains occupied. The team works on alternate positions as time allows. Some of the work can be accomplished at night. Team survivability measures including use of cover, concealment, and field fortification are covered in chapter 9.

COMMUNICATIONS

Because the Stinger teams are widely dispersed and subject to frequent and rapid moves, radio is the primary means of communications during employment. Radio nets are supplemented and paralleled by wire nets when time, the tactical situation, and security permit their use.

STINGER SECTION COMMAND NET

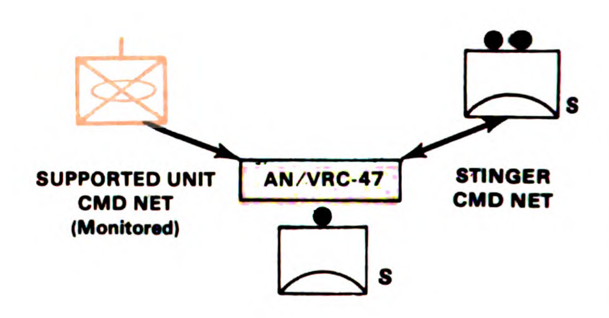


INFORMATION RECEIVED

- Air defense warnings and orders.
- Movement orders.
- Command and control information.
- Any other information essential for section operations.

The Stinger team operates in the Stinger section command net. This is a two-way net between the Stinger section headquarters and the Stinger teams.

SUPPORTED UNIT COMMAND NET



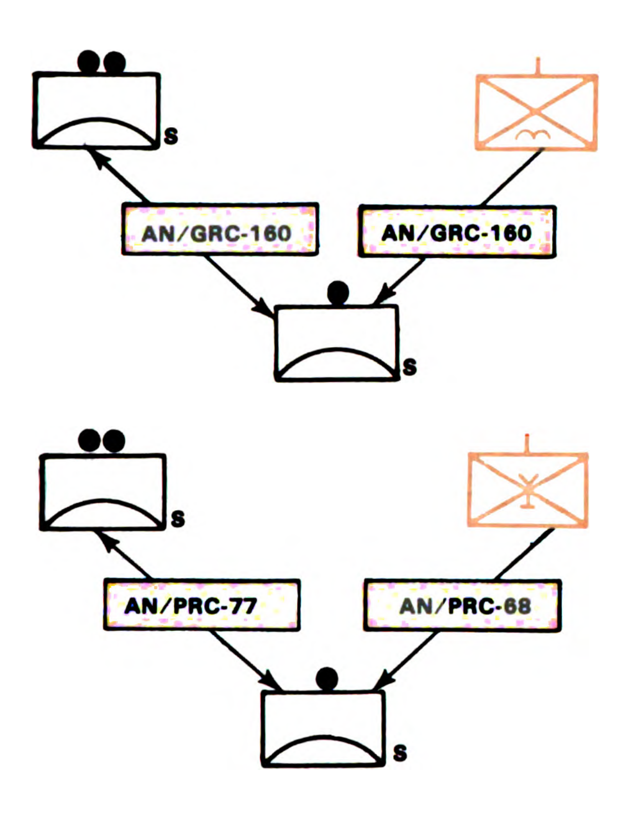
INFORMATION RECEIVED

- Team placement when in DS of a company team.
- Coordination instructions for the team.
- Command and control information.
- Logistics.
- Other tactical considerations.

Stinger teams may be assigned to support ***Armored, Infantry, Mechanized*** (AIM) ***Divisions; Separate Brigades;*** and ***Armored Cavalry Regiments.*** Stinger teams are equipped to operate in the parent section command net and monitor the supported unit command net. Monitoring the supported unit command net keeps the Stinger team informed of ongoing tactical operations. The Stinger team is authorized an AN/VRC-47 radio.

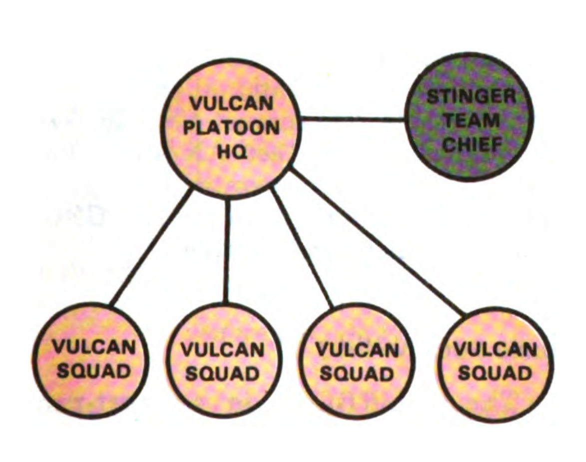
When the Stinger team uses the Section Command Net and the supported unit nets in this manner, it is receiving a great deal of information.





Stinger teams may also be assigned to support ***Airborne or Airmobile Divisions.*** Stinger teams with an Airborne Division are equipped with two AN/GRC-160 radio sets. Teams operate in the Stinger section command net and the supported unit command net. The Airmobile Division's teams are equipped with the AN/PRC-77 for use in the Stinger command net and the AN/PRC-68 for use in supported unit command net.

STINGER NETTING with VULCAN ELEMENTS

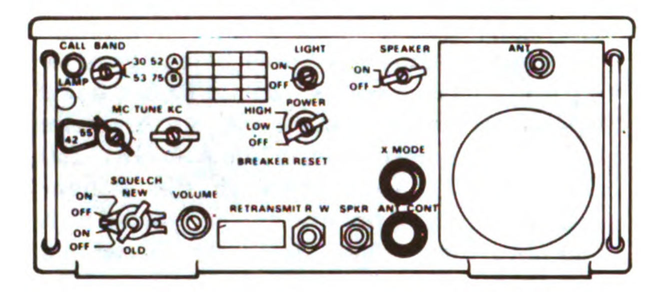


When a Vulcan platoon is in direct support of a company team also supported by Stinger, the Vulcan platoon leader, Vulcan squads, and Stinger team(s) operate in the Vulcan platoon net. By joining the Vulcan platoon command net, the Stinger-team will receive all early warning information, changes in weapons control status, air defense warning, alert status, and other information given to the Vulcan platoon. This method insures coordination of the air defense effort. If the Stinger section chief needs to get information to the Stinger team, he can contact the Vulcan platoon leader who can pass on the information.

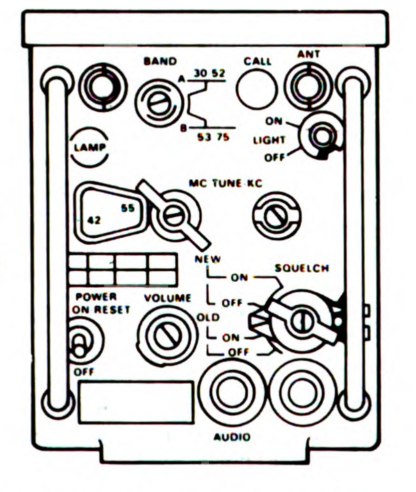
Other netting arrangements with organic radios may be employed depending on the tactical situation.

TEAM RADIO SETS

Radio Set AN/VRC-47



RECEIVER-TRANSMITTER RT-524/VRC



AUXILIARY RECEIVER, RADIO R-442/VRC

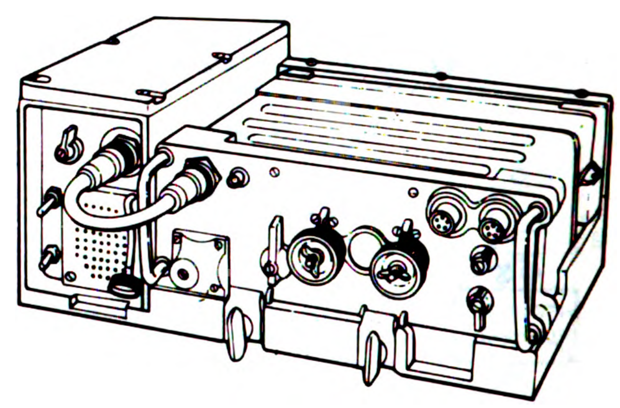
TECHNICAL CHARACTERISTICS

TYPE OF SERVICE	SINGLE CHANNEL VOICE
FREQUENCY RANGE	BAND A 30 TO 52.95 MHz BAND B 53 TO 75.95 MHz
PLANNING RANGE	LOW 8 Km HIGH 41 Km
REMOTE OPERATION	USES AN AN/GRA-39B

References: TM 11-5820-401-12
TC 11-4

The basic components include a receiver/transmitter (RT) and an auxiliary receiver used with this set.

Radio Set AN/GRC-160



TECHNICAL CHARACTERISTICS

TYPE OF SERVICE	SINGLE CHANNEL VOICE
FREQUENCY RANGE	LOW BAND 30 TO 52.95 MHz HIGH BAND 53 TO 75.95 MHz
PLANNING RANGE	8 Km

Reference: TM 11-5820-498-12

Radio set AN/GRC-160 incorporates the components and operational characteristics of the portable FM radio set AN/PRC-77 and the vehicular radio set AN/VRC-64. The AN/PRC-77 can be operated as a portable radio by removing it from the AN/GRC-160 vehicle mounted configuration.

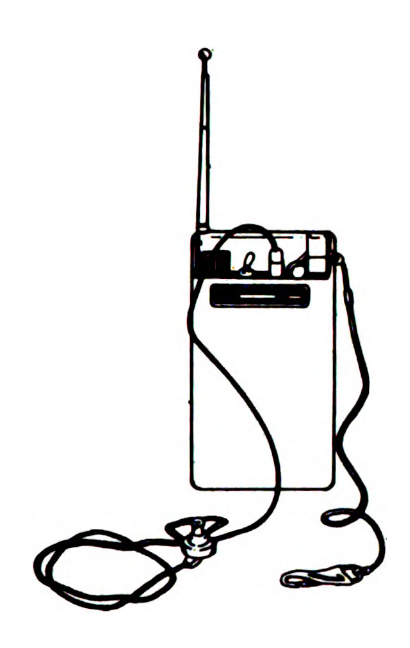
Radio Set AN/PRC-77

The AN/PRC-77 is a short-range, lightweight, frequency modulated (FM), fully transistorized radio set that can be man-packed and operated with speech security equipment.

Stinger section communications are covered in FM 44-18.



Radio Set, AN/PRC-68



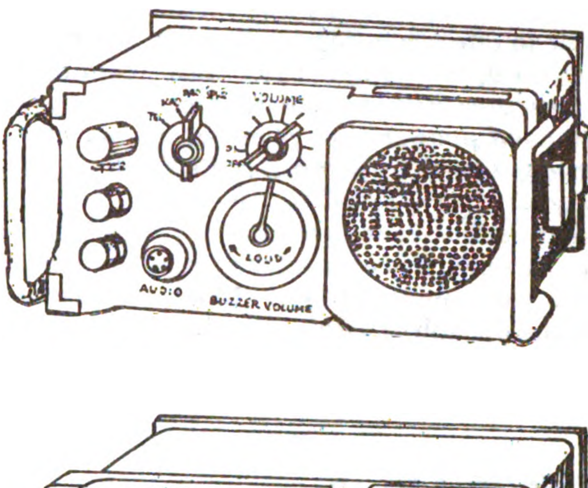
TECHNICAL CHARACTERISTICS

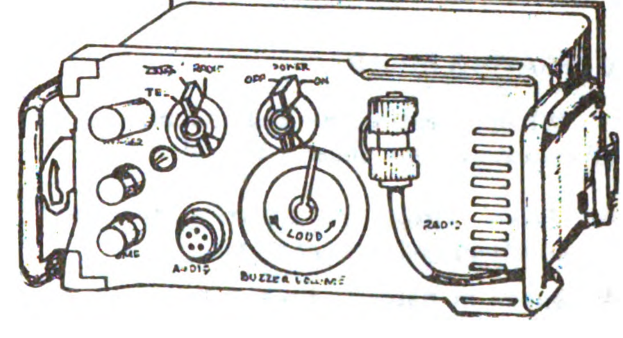
TYPES OF SERVICE	SINGLE CHANNEL VOICE
FREQUENCY RANGE	30 TO 79.95 MHz
PLANNING RANGE	275m (301 yds) WITH ANTENNA RETRACTED 1.6 km (1 mi) WITH ANTENNA EXTENDED

Reference: FM 24-24

The AN/PRC-68 is a battery operated, hand-held, FM radio set. Stinger teams in the Airmobile Division can both transmit and receive communications on the supported unit command net. By attaching a secure voice module (SVM) to the AN/PRC-68, it is capable of operating in the secure mode.

Radio Set Control Group AN/GRA-39B





TECHNICAL CHARACTERISTICS

TYPES OF SERVICE	SINGLE CHANNEL VOICE
FREQUENCY RANGE	300 TO 3500 Hz
PLANNING RANGE	3.2 km (2 mi) USING FIELD WIRE

References: FM 24-24 and TC 11-4

This battery-operated remote control system consists of a local control unit and a remote control unit. When connected with field wire, the AN/GRA-39B can be operated from a distance of up to 3.2 km (2 mi). By using the remote control unit, Stinger team members can transmit and receive communications information while positioned away from their vehicles.

COMMUNICATING by RADIO

The Stinger team radio operator must be able to effectively communicate in a net. To do this, he must use radiotelephone procedures. Radiotelephone procedures ***must be used properly to prevent giving the enemy useful information.*** Radiotelephone procedures are based on the ACP 124 series. Each radiotelephone station forms part of a net in which it is connected to other stations. The net control station (NCS) maintains circuit discipline within a net. Here are a few definitions and fundamentals used for communicating by radio.

OPERATING RULES

When operating in a radiotelephone net, all operators must observe the rules:

- **Listen before transmitting to avoid interfering with other transmissions.**
- **Speak in natural phrases, not word by word.**
- **Speak slowly and distinctly at normal voice level directly into the microphone, just as you would into a conventional telephone.**

Nets

The type of net is determined by the NCS according to operating conditions. The types of nets are:

Free net. In a free net, traffic is exchanged without prior permission from the NCS. A net is deemed to be a free net unless otherwise ordered by the NCS.

Directed net. In a directed net, stations must obtain permission from the NCS prior to conducting communications with other stations.

Call Signs

A call sign is a letter--number--letter combination assigned to a unit. Every unit in an organization has a different call sign. The complete call sign is used under these conditions.

- When opening and closing a net.
- When entering a net in which you do not normally operate.
- When responding to a net call.
- When requested by NCS or any other station.
- When radio reception is poor.

Suffixes

Call sign suffixes are two-number groups assigned to positions or activities within a unit. The call sign and suffix together identify the sender and receiver of a radio message.

When the NCS is prepared to open the net, he will call the net and issue a challenge to the net.

EXAMPLE

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA
TWO EIGHT--AUTHENTICATE BRAVO LIMA--OVER

The first station responds to the NCS, answers his challenge, and issues a challenge to him.

EXAMPLE

ALFA TWO DELTA TWO EIGHT--THIS IS--
BRAVO ZERO FOXTROT ZERO SEVEN--I AUTHENTICATE
HOTEL--AUTHENTICATE MIKE PAPA--OVER

The NCS answers to the net and issues a challenge which is answered by the next station in sequence.

EXAMPLE

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA TWO EIGHT-I AUTHENTICATE PAPA--AUTHENTICATE BRAVO FOXTROT--OVER

The remaining stations respond to the net, answer the challenge, and issue a challenge for the next station. The last station does not issue a challenge as all stations will have answered a challenge at this point.

EXAMPLE

ALFA TWO DELTA--THIS IS--CHARLIE EIGHT TANGO ONE ONE--I AUTHENTICATE LIMA--AUTHENTICATE DELTA XRAY--OVER

ALFA TWO DELTA--THIS IS--LIMA SEVEN LIMA ZERO NINE--I AUTHENTICATE CHARLIE--OVER

Should a station not answer, the next station in order will wait 5 seconds and then answer. The station that missed its turn will answer last.

The NCS will respond and indicate type of net.

EXAMPLE

FREE NET:

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA TWO EIGHT--OUT

DIRECTED NET:

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA TWO EIGHT--THIS IS A DIRECTED NET--OF WHAT PRECEDENCE AND FOR WHOM ARE YOUR MESSAGES--

Note: Authentication is not required when the net is opened for the first time of a new radio day. In a high threat area where enemy imitative communications deception has been extensive, normal authentication will be used.

When the NCS is prepared to close a net, he will call the net and issue closedown instructions.

EXAMPLE

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA TWO EIGHT--CLOSE DOWN--OVER

The first substation responds to the NCS and issues a challenge to him.

EXAMPLE

ALFA TWO DELTA TWO EIGHT--THIS IS--BRAVO ZERO FOXTROT ZERO SEVEN--AUTHENTICATE KILO GOLF--OVER

The NCS answers the challenge to the net and each station responds to the NCS indicating they have received this transmission.

EXAMPLE

ALFA TWO DELTA--THIS IS--ALFA TWO DELTA TWO EIGHT--I AUTHENTICATE DELTA--OVER

ALFA TWO DELTA TWO EIGHT--THIS IS--BRAVO ZERO FOXTROT ZERO SEVEN--ROGER--OUT

ALFA TWO DELTA TWO EIGHT--THIS IS--CHARLIE EIGHT TANGO ONE ONE--ROGER--OUT

ALFA TWO DELTA TWO EIGHT--THIS IS--LIMA SEVEN LIMA ZERO NINE--ROGER--OUT

All stations remain on the air until the last station has responded.

Radio/telephone Prowords

Certain commonly used prowords have distinct meanings and are used to shorten the amount of time in voice communications and to avoid confusion. Use them when talking on the telephone or the radio.

OVER—*"This is the end of my transmission to you and a response is necessary. Go ahead, transmit."*

SAY AGAIN—*"Say again all of your last transmission."*

CORRECTION—*"An error has been made in this transmission (or message indicated). The correct version is ______________."*

I SAY AGAIN—*"I am repeating transmission, or portion indicated."*

ROGER—*"I have received your last transmission satisfactorily."*

WILCO—*"I have received your last transmission satisfactorily, understand it, and will comply."*

OUT—*"This is the end of my transmission to you and no answer is required or expected."*

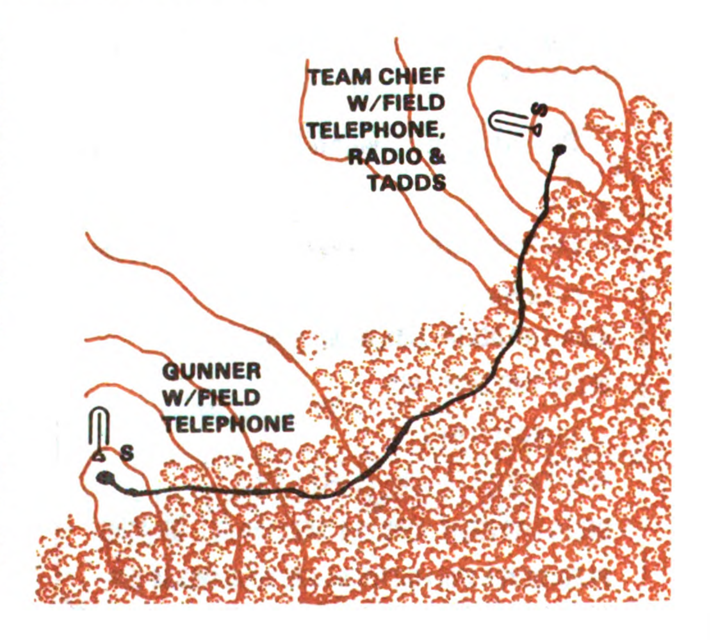
Frequency Assignments

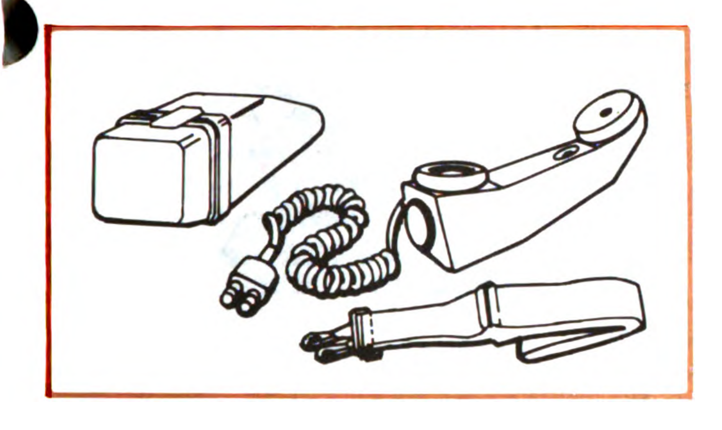
Each radio net is assigned a frequency. These frequencies are changed by the unit CE officer and are changed when and where needed. The Stinger team radio operator should be adept at changing radio frequencies. Refer to the technical manual covering your radio for instruction on how to do this.

TEAM WIRE COMMUNICATIONS

The Stinger team uses wire communications whenever possible. Team positions may be interconnected by wire for local communications in static situations or during listening or radio silence. When the supported unit establishes its wire system, the Stinger team can communicate with its section headquarters by wire. Information on how to connect your field telephone and use of field wire is explained in FM 24-20, Field Wire and Field Cable Techniques.

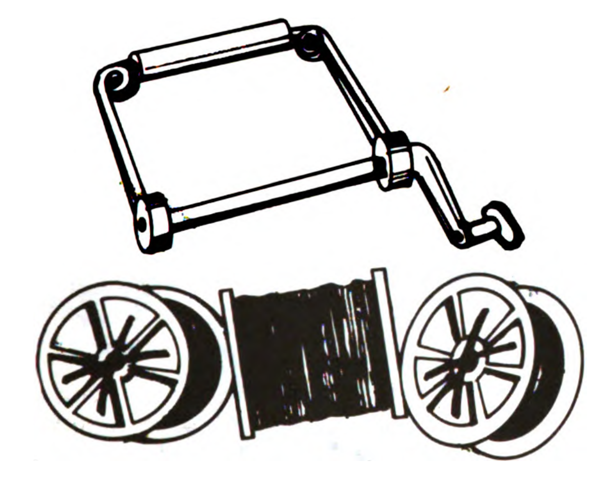
Members of split Stinger teams also use wire to communicate. Because only one radio and one TADDS are within the team, the team chief stays with the radio and TADDS. The gunner strings wire to another position, attaches the field telephone, and establishes communications with the team chief.





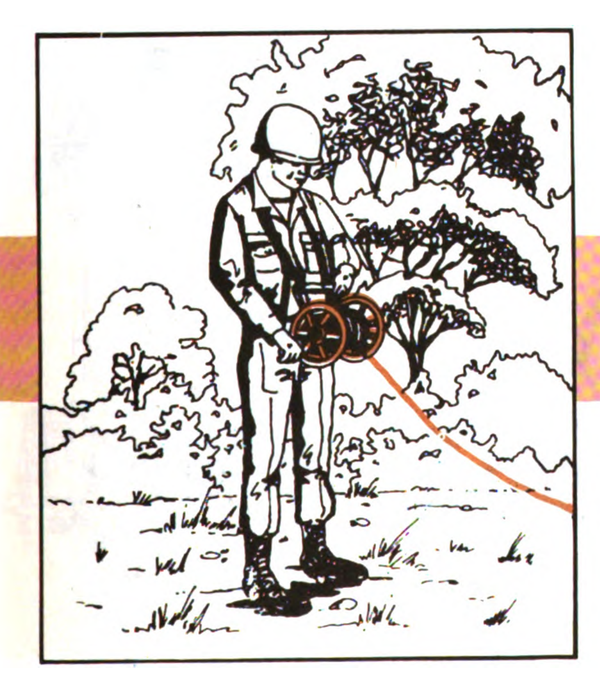
Field Telephone

Each Stinger team is issued two telephone sets. The TA-1/PT telephone is a sound-powered telephone that provides facilities for talking and signaling without batteries. It weighs only 3.5 pounds and has a range with field wire of approximately 10-15 km. This telephone set can be used to advantage in forward areas, employed in switched wire networks (during periods when radio nets are closed), or as point-to-point circuits.



Cable Reeling machine, RL-39

Reel unit RL-39 is a lightweight, portable, chest-type reel consisting of an axle with carrying handles, carrying straps, and a crank for rewinding. The RL-39 mounts spool DR-8-A, which has a capacity of 0.4 km (¼ mile) of field wire WD-1/TT (wire not included as a component). This reel is normally used to lay short local circuits, up to 0.4 km, over difficult terrain or in forward areas.

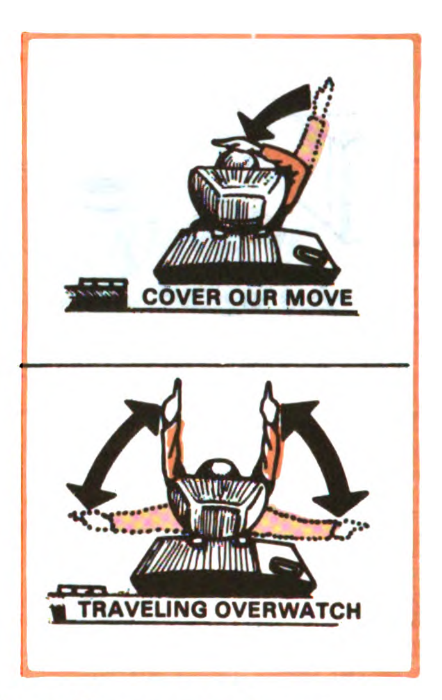


Field wire is recoverable and is reusable; always take it up before you move out of a position, if the situation permits.

TEAM VISUAL SIGNALS

Arm and hand signals may be used by the Stinger team members to communicate among themselves and with supported unit personnel. Arm and hand signals are useful when radio or wire is not available and battlefield noise does not permit use of voice commands. Arm and hand signals should be used only when absolutely necessary. Standard and special hand-and-arm signals to control small unit actions, recovery operations, and vehicle movements for the tank and mechanized infantry company team are covered in Fm 71-1, The Tank and Mechanized Infantry Company Team.

When Stinger teams are supporting a maneuver unit they should be familiar with the visual signals used by leaders of the unit. Two examples are shown:



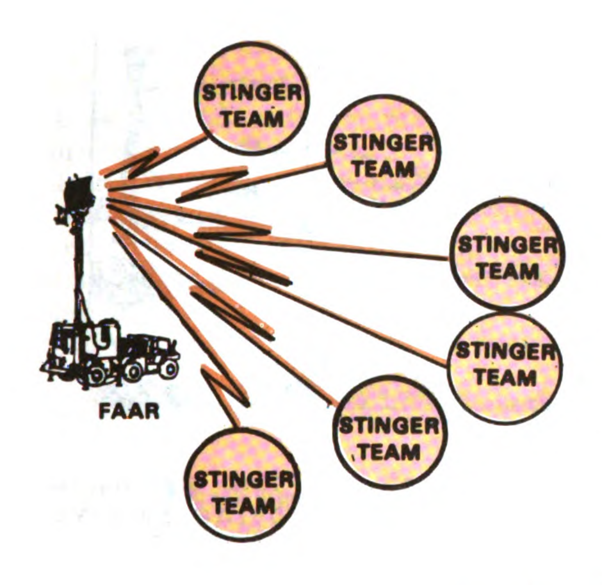
Arm and hand signals for the communication of Stinger fire commands are:

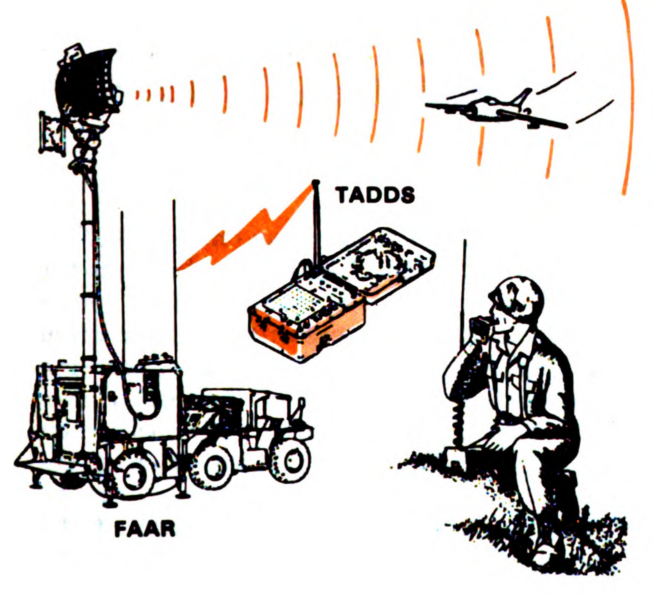


FM 21-60, Visual Signals, contains a complete list of each type of visual signal.

ALERT WARNING

A Stinger team may be warned of an approaching aircraft or it may visually detect the target without prior warning. Warning of the approach of an aircraft increases the chances of successfully engaging it. An alert warning will usually give general location and heading of the aircraft and a tentative identification.





EARLY WARNING NETS

The Stinger team may receive early warning/alert information which is broadcast over the ADA early warning broadcast net. This data is received at section headquarters over the ADA EW net. In turn, section headquarters sends pertinent information to the Stinger teams over the section command net.

FAAR/TADDS SYSTEM

The FAAR/TADDS system is the primary means of providing alerting information to the Stinger teams. This information is transmitted by radio-frequency data link (RFDL) to TADDS receivers located with the Stinger teams.

Forward Area Alerting Radar

The FAAR system is a complete, self-contained, highly mobile radar system. It provides early warning in the form of general target location in terms of distance and direction. It also provides identification in terms of friend or unknown for each target displayed. The RFDL system provides a data communications link from the FAAR to the TADDS at the Stinger positions. The FAAR has an additional capability of passing voice radio transmissions.

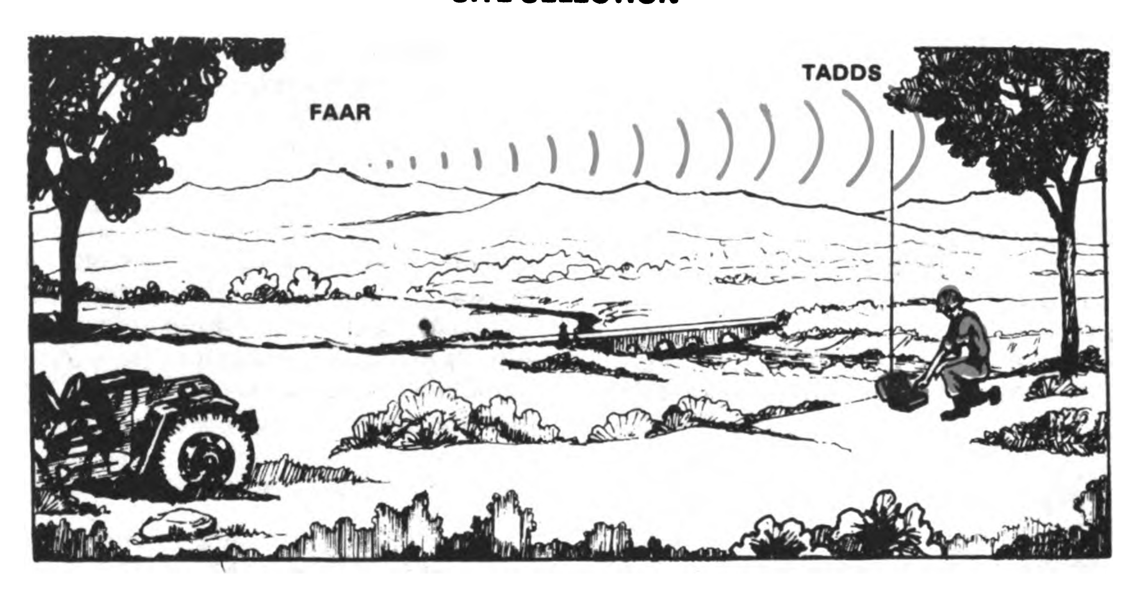
Target Alert Data Display Set (TADDS)

The TADDS is a lightweight receiver which receives and displays target alert information sent from a FAAR. It displays location and tentative identification of aerial targets which are detected by a FAAR. The TADDS display consists of a grid containing 49 squares (a 7x7 grid). Each side of a square represents 5 kilometers. Indicators on the TADDS appear within the proper square when an encoded message is received. A green disk appears for a FRIEND. An orange disk appears for an UNKNOWN. Either or

both disks may appear in a square. If both appear, this means that at least two aircraft are in the area, one a friend and one an unknown.

The TADDS also has the capability of receiving voice transmission over the RFDL frequency.

SITE SELECTION



For best reception, a site for the TADDS is selected which allows as close to a clear line of sight to the FAAR as possible. It should be emplaced where a maximum signal strength reading is obtained. The keyed characteristic of the signal when heard from the speaker indicates that data link signals, not interference, are being received. Emplacement of the TADDS is quickly accomplished by one man. The operator performs the operational checks listed in TM 9-1430-589-12 to insure proper operation.

USING TADDS

Line of sight is necessary between the FAAR and the TADDS at the team location. The team chief tunes the TADDS receiver to the frequency of the nearest FAAR. If no signal is received, he then consults the CEOI for the frequency and code of other FAARs. When he receives a signal, he requests the coordinates of that FAAR from his section leader.

After netting with the FAAR, the TADDS must be oriented to north. This is done by using the compass on the TADDS. The position of the TADDS in relation to the FAAR must then be plotted. The center square of the grid represents the location of the FAAR. Stinger team personnel, knowing the location of the FAAR and their own location can plot and mark their position on the TADDS display. When this is done, the direction and range of any target can be easily determined. The flight path of the target can be determined by observing the target disks exposed as the target progresses along the grid.

Using TADDS in a Moving Vehicle

The TADDS can be operated while the team is on the move by emplacing it on the vehicle hood or on the gunner's lap. Visually orient the TADDS to a prominent terrain feature located on your map, as metal in and around the vehicle will prevent you from obtaining a correct compass reading. As the vehicle is moving, turn the TADDS slightly to compensate for any changes in direction. An audible tone should alert the gunner to new information being displayed on the TADDS. Focus your attention on the display squares closest to the square that you are in. Any targets appearing within 5-7 kilometers of your position are of immediate concern to you. These targets must be identified.

RELATIONS with SUPPORTED UNIT

The Stinger team chief coordinates with the supported unit commander or his representative as soon as he is given his mission. When the team habitually supports a unit, coordination may become routine. Good relations between Stinger team members and the supported unit are a must. The Stinger team chief should offer advice on air defense matters and keep the supported unit commander informed of ongoing air activity whenever necessary. While the section chief normally coordinates with the supported unit commander on team messing, resupply, refueling, etc., the team chief will have to coordinate on a local level. Keep in mind that you can keep good relations with the supported unit by observing some of these do's and don'ts.



- Keep the commander informed on air defense matters.
- Don't compromise the security of the supported unit.
- Follow the movement plan carefully.
- When directed to occupy a specific position, do it as quickly as possible.
- When attached, coordinate on-site selection with the unit commander.
- Be tactful at all times.

HOW to OPERATE as a SPLIT TEAM

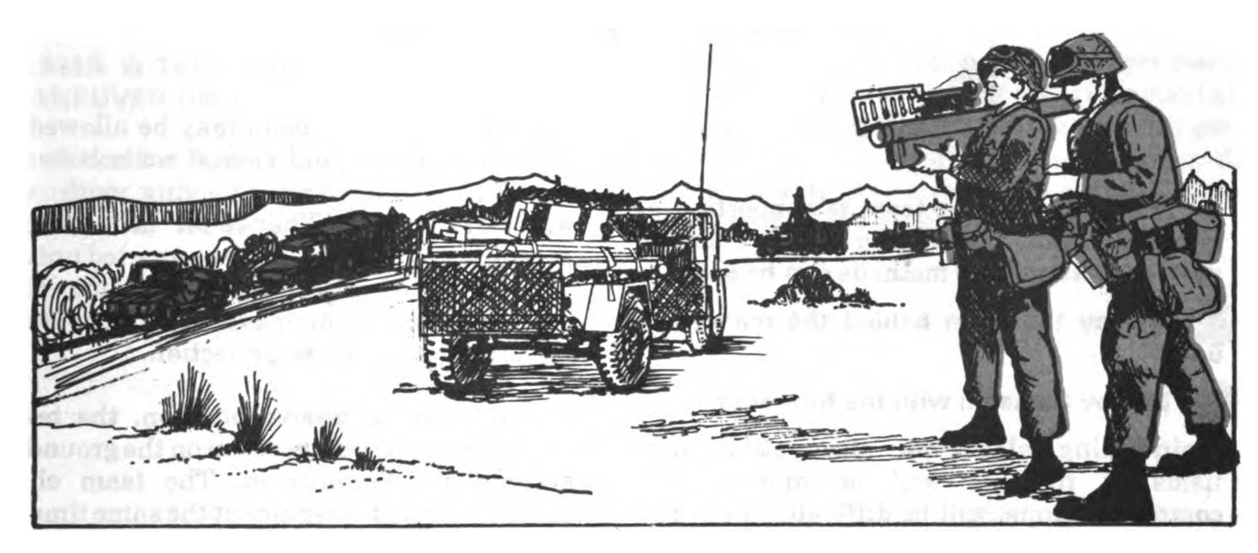
A Stinger team is best employed as a two-man team. In certain situations, however, the team may be split. Splitting the team degrades command and control and the ability to detect, positively identify, and engage aircraft. If your team has to operate in this manner, here are some points to consider.

- **Split the basic load: two complete weapons and one missile-round per team member.**
- **The team chief should have access to the radio. He should relay command and control information to the gunner over the team wire net.**
- **Each team member keeps the other informed of any activity such as when an aircraft is detected.**
- ***When separated from the team chief, the gunner is fully responsible for correct identification of an aircraft which he engages* (see chap 4 for identification procedures).**

PROTECTING a CONVOY

When protecting a convoy, Stinger personnel normally engage aircraft only if the column comes under attack. If early warning information is received via the section command net or TADDS, the Stinger team chief relays the information to the convoy commander. After sighting or being alerted to enemy aircraft, the convoy commander alerts his vehicle commanders to the possible air attack. The convoy is then prepared to engage the aircraft with all available small arms and machineguns. The convoy commander may take one of three options with his vehicles, and order the vehicle commanders to:

1. Continue the march at increased speed.
2. Stop and move to the shoulders of the road.
3. Disperse and seek cover and concealment.



Regardless of the option chosen by the convoy commander, the Stinger team reacts in only one manner. When air attack is imminent, the Stinger team moves its vehicle off the road, dismounts, and takes up the best available firing position. This position should have good visibility and be located where Stinger can be safely fired.

Stinger teams should be proficient in ***quick-reaction drill--mounted team drill***–described in chapter 17.

Once the team is positioned, the team chief bases his engagement decision on the weapons control status in effect and by applying hostile criteria (see chapter 5). ***The right to fire in self-defense is never denied.*** The gunner engages the aircraft upon receiving the team chief's engagement order. Ideally, the aircraft will be engaged on its first pass, before the attack run is made on the convoy. When the column is attacked, the combined fires of all available small arms, machinguns, Stinger, and other ADA weapons are directed on the aircraft. If not destroyed, the aircraft will at least have his ordnance delivery impaired.

When the immediate threat of air attack has subsided, the Stinger team notifies section headquarters of the attack, missile expenditure, and any other information required by the local SOP. The team rejoins the convoy, passing other vehicles as necessary to resume its assigned position.

Stinger teams may be prepositioned at critical points along the convoy's route. This method of employment is used when a slowdown, halt or congestion of the convoy is likely at a critical point. These critical points, such as road junctions, bridges, and refueling points, provide prime targets for threat air strikes. Prepositioning is used when the distance to be travelled is short (e.g., 5 kilometers) or when circumstances permit the teams to blend into the column after it passes the critical point. Sufficient time must be available for the team to move ahead of the convoy and occupy its position prior to the convoy passing the critical point.

The team chief selects a suitable team position that affords an early engagement capability. This means that the position should be at least 1-2 kilometers away from the critical point, in the expected direction of air attack. If other Stinger teams are available to defend the critical point, they will be approximately 2-3 kilometers away from you to insure overlapping fires. Other requirements described earlier in this chapter should be considered in selecting a position.

POSITIONING

When the Stinger team is supporting a maneuver unit, positioning of the team is very important. Two methods can be used:

(1) **Deploy the team behind the maneuver unit.**

(2) **Deploy the team with the formation.**

Maintaining all-around observation and fields of fire, as well as maintaining communications, will be difficult. The team should be able to communicate with the section headquarters and the supported unit. In addition, the team should be able to receive early warning information at any time. When positioning--

- Select positions on high ground, but don't silhouette on the skyline.
- Use cover and concealment to reduce the effects of enemy ground fire.
- Remember backblast safety requirements.
- Move to an alternate position immediately after firing if the tactical situation permits.
- Watch constantly for aircraft, including ATGM-armed helicopters.
- Move when the supported unit/element moves, unless directed otherwise.



DEPLOYED BEHIND MANEUVER UNITS

When deployed to its rear, the Stinger team follows the unit by successive movements. Teams should remain approximately 500 meters behind the maneuver unit. The section chief has positioning authority of teams with this mission. He selects team positions and gives special instructions for engagement and sectors of fire. The team may be allowed to select the fastest and easiest route between positions rather than moving with the supported unit. The team chief must coordinate closely with the supported unit in this type of maneuver. Without this coordination, the maneuver unit may outrun its Stinger air defense protection.

At each successive position, the team chief selects the best position on the ground to accomplish the mission. The team chief should be alert to displace at the same time as the maneuver unit. On position the team should place the vehicle under cover and conceal it as much as possible. The team should then look for a good firing position not too far from the vehicle. By connecting field wire between the vehicle radio and the AN/GRC-39B, the team chief can maintain communications while away from his vehicle. The position may be as far as 3.2 km (2 mi) away from the vehicle. He should also emplace the TADDS immediately so that the team can receive an alert warning. Another consideration is safety. Be sure that no other troops or equipment are within the backblast danger area of the firing position.

The team chief will have to use his judgement on how many weapons will have to be off loaded. If the stay is just for an hour or less, it should be safe to have about two weapons and one or two missile rounds immediately available. The ideal situation is to have two weapons and two missile rounds immediately available and the remainder of the basic load readily accessible.

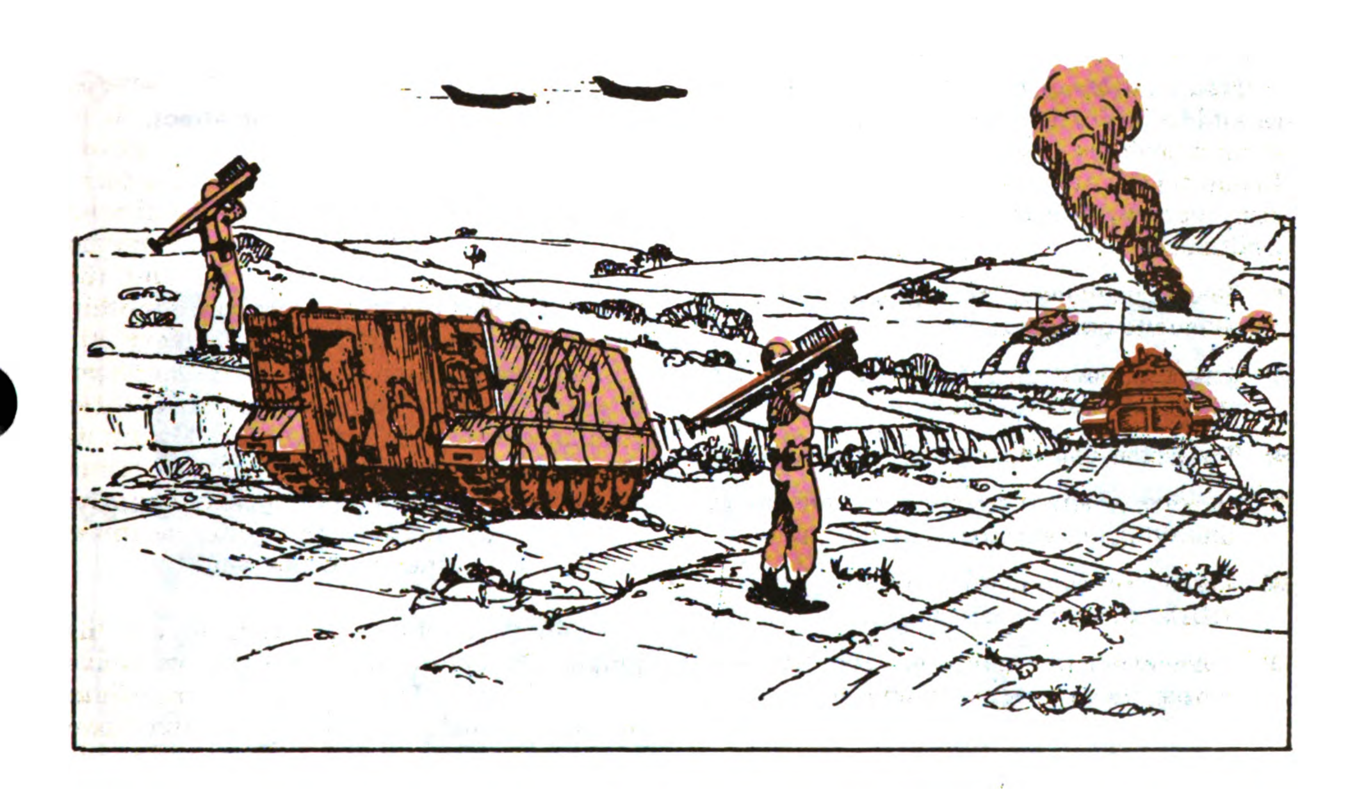
The team should be always ready to defend the supported unit. However, there are times when the unit is more vulnerable to air attack. This is when Stinger teams should be most prepared against surprise attack. An example is when the unit is in an assembly area.



2

TEAMS WITHIN THE FORMATION OF A MANEUVER UNIT

When the Stinger team is in support of a maneuver unit, usually a company team, it moves with the unit. The company team commander has positioned the Stinger team in direct support of his unit and gives special instructions for firing. Usually, the Stinger team in direct support of a maneuver unit remains with the overwatch element. The team occupies the best position available.



The Stinger team may have its own transportation or be mounted on a tracked vehicle on a share-a-ride basis. If the team is mounted and traveling when warning of an air attack is received, it dismounts from the vehicle as quickly as possible. The team immediately takes the best firing position available. If the team is mounted on a shared tracked vehicle, reaction time (dismount to prepare to fire the weapon) will be reduced. When the team is in a firing position on the ground, it can react much faster to air attack.

To communicate with section headquarters, the Stinger team mounted on a shared tracked vehicle will have to relay information through the supported unit.

TEAM OPERATIONS at NIGHT

Reduced visibility during the hours of darkness will limit the intensity and effectiveness of enemy air attack. Low-level attacks by threat aircraft can be expected. At night, however, the air threat is not as great.

This is particularly true in the forward area where frequent movement of forces complicates the enemy's ability to see his targets.

AIR DEFENSE

If an attacking aircraft is seen, it can be engaged. The difficulty encountered in visually identifying aircraft during periods of darkness and inclement weather handicaps, but does not eliminate, nighttime use of Stinger for air defense. Therefore Stinger teams should generally not attempt to engage hostile aircraft at night if those aircraft are not attacking the asset they are defending. Visual detection, visual identification, and determining range ring size are difficult, if not impossible. Stinger can be used under two conditions--

- **In a self-defense role when the supported unit or asset is under air attack.**
- **If a weapons free status is in effect.**

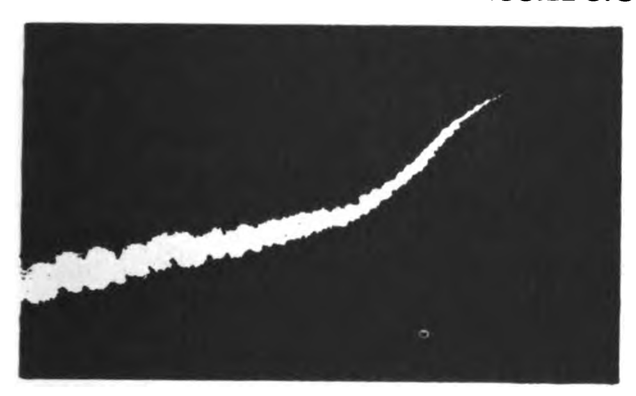
HOW TO LOCATE THE TARGET



Aircraft detection and acquisition may be aided by early alerts, engine sounds, reflected light, moonlight, enemy flares, and engine exhaust flames. For targets above the horizon, use the figure 8 method. For targets below the horizon, use the sweeping method. These methods are described in chapter 3. When you have achieved IR lock, proceed with the engagement as in the daytime.

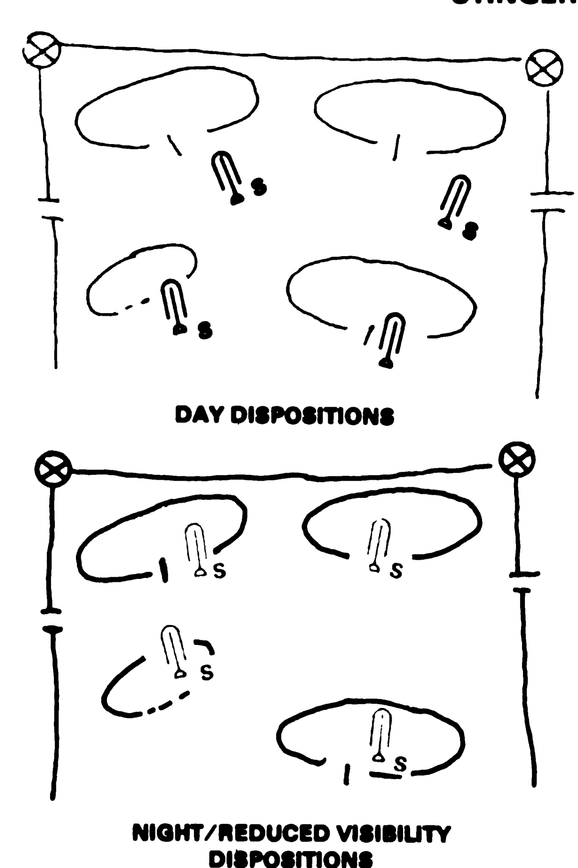


MISSILE SIGNATURE



The launch of a Stinger missile is easily detectable at night. Enemy forces on the ground may well be able to determine your position on the ground. Although Stinger teams normally move to alternate positions after each engagement, enemy suppressive fire may force the supported unit to move. For this reason, Stinger teams normally respond only to direct attack on the asset they are defending at night.

STINGER TEAM SECURITY



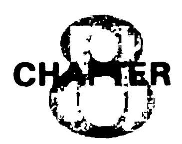
DAY DISPOSITIONS

NIGHT/REDUCED VISIBILITY DISPOSITIONS

Stinger teams supporting a unit that is moving during the night or during times of reduced visibility, normally move with the unit, remaining within the unit's formation for security. Teams supporting a unit in position at nightfall, move to positions within the perimeter of the supported unit for better security against ground attack. The section chief will tell the team when and where to displace at night. However, the team chief should closely coordinate with the supported unit commander on the exact location of the position. The selected positions should not compromise the commander's plan for defense of his unit. An example of day-night positioning is shown.

BINOCULARS

Binoculars are far superior to the naked eye in daytime, and at night when ambient light (moonlight, flares, searchlights, etc.) exists. The team chief should use them to assist the gunner to find the aircraft. TC 44-30 tells you how to use them.



STINGER in DEFENSE of ADA UNITS

Stinger teams are allocated to ADA units to provide self-defense protection. This need has developed because of the improved capability of threat forces to destroy our ADA units. Stinger can be relied on to protect these ADA units when they are displacing, traveling in a convoy, emplacing, and refueling, or during other critical periods that make the units vulnerable to air attack. This chapter discusses how Stinger can be employed to protect these ADA units from enemy air attacks.

CONTENTS

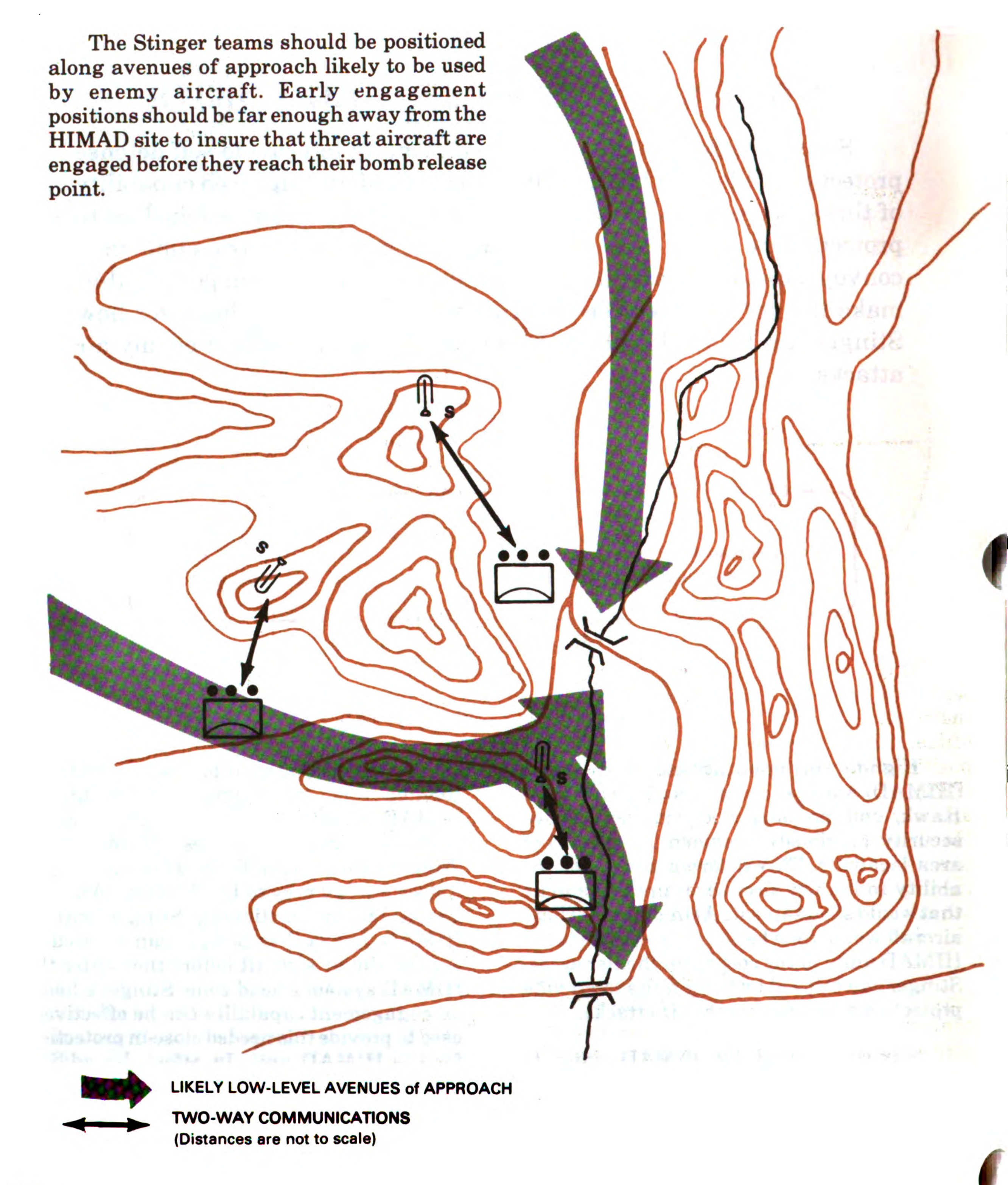
STINGER with HIMAD UNITS

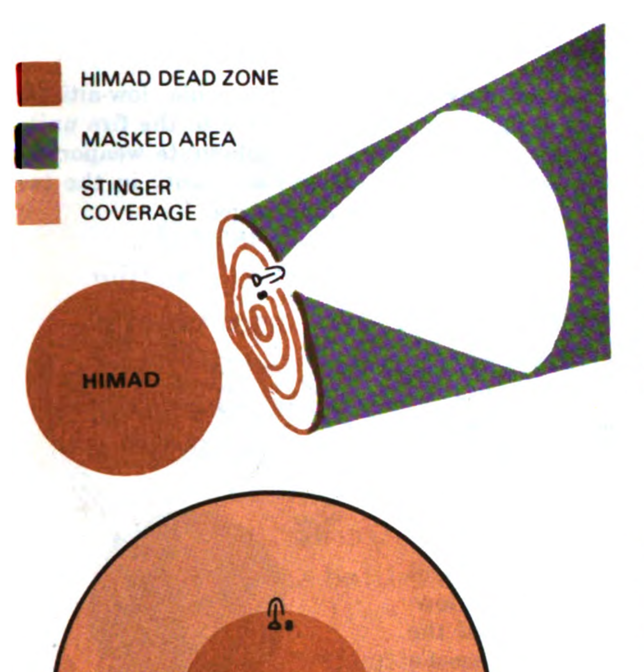
High-to medium-altitude air defense (HIMAD) units, such as Nike Hercules and Hawk, can no longer expect the relative security previously provided by their rear area locations. Threat forces now have the ability to launch aircraft in great numbers that would soon saturate ADA defense. These aircraft would then be able to penetrate to the HIMAD units in the corps and theater areas. Stinger can be used by these units to provide protection from these mass air attacks.

Stinger is used by HIMAD units to compensate for system limitations. (For example, Nike Hercules is not designed for low-altitude air defense coverage.) Stinger can be incorporated into their defense to counter this low flying aircraft threat. HIMAD radar systems are vulnerable to electronic countermeasures (ECM). Since Stinger is not a radar-directed missile system, it does not fall prey to ECM tactics. Another advantage in positioning Stinger with a HIMAD unit is that Stinger can be used to engage threat aircraft before they enter the HIMAD system's dead zone. Stinger's head-on engagement capability can be effectively used to provide this needed close-in protection for the HIMAD unit. In effect, by adding Stinger, the HIMAD unit is allowed to concentrate on its primary mission – high-to medium-altitude air defense.

EMPLOYMENT

The Stinger teams should be positioned along avenues of approach likely to be used by enemy aircraft. Early engagement positions should be far enough away from the HIMAD site to insure that threat aircraft are engaged before they reach their bomb release point.





The team may be positioned to cover an area that is masked by terrain features, and is "unseen" by HIMAD radars. In this situation, the Stinger team is positioned within the masked area. The position selected should allow you to have good observation. If possible, this position should also allow you to see the HIMAD unit. In this way, you can see attempted air attacks from other directions.

On flat terrain, Stinger teams are placed opposite each other on the site's perimeter. This will allow 180° coverage by each team. Used in this way, Stinger can engage aircraft before they enter the HIMAD's dead zone.

Stinger teams cannot operate in isolated positions indefinitely. They must be supplied with rations, water, and other supplies. Team chiefs should coordinate with the HIMAD unit for these items.

COMMAND and CONTROL

Stinger personnel in Hawk units usually receive their rules of engagement and firing instructions directly from the tactical control officer (TCO). By marking Stinger team positions on their plan position indicator (PPI), Hawk personnel can monitor approaching aircraft not engageable by Hawk, and alert Stinger team members. In this way, some early warning can be given to the Stinger teams for those aircraft using terrain masking to avoid being engaged by Hawk systems.

Stinger personnel in Nike Hercules units may receive some guidance from the battery control officer (BCO) through his battery control station. Normally, team personnel will operate in accordance with their battery's tactical SOP. Since Stinger will be used primarily to engage undetected aircraft approaching the Nike Hercules site, it is unlikely that Stinger team members will receive any early warning information from the BCO.

Usually, the AN/PRC-77 radio will be for communications with the HIMAD unit. However, wire communications can also be used. Teams can be linked by wire with the following HIMAD control vans:

NIKE HERCULES

- Director Station

HAWK

- Battery Control Central (BCC)
- Platoon Command Post (PCP)

STINGER with CHAPARRAL UNITS

When employed with Chaparral units, Stinger can be used for self-defense, augmentation of a defense, or as a substitute weapon. As a self-defense weapon for a Chaparral unit, Stinger can be used to cover a nonoperational fire unit. In augmenting a Chaparral defense, the Stinger teams may be used to provide low-altitude coverage to areas inaccessible to the fire units. Stinger can be used as a substitute weapon for Chaparral because of the similarity in the two missile systems' effective ranges.

EMPLOYMENT

In a self-defense role, Stinger protects exposed Chaparral fire units. One example of this is when a Chaparral fire unit is emplaced, but is not completely masked by hilly terrain. A threat attack helicopter, using a popup tactic can rise behind the terrain and fire at the Chaparral fire unit. The Stinger team in this instance can be positioned on the other side of the hill to counter such an attack.



Stinger can be used to augment Chaparral's defense of a critical asset. The teams are positioned to cover vulnerable areas in the low-altitude defense. These vulnerable areas are formed because of the limited number of Chaparral units allocated to the critical asset's defense. The areas can be formed by surrounding terrain features which may deny access to Chaparral fire units. For example, Stinger teams can be positioned on steep hills that the Chaparral fire units cannot climb.

Stinger provides continuous air defense coverage while the Chaparral fire unit is nonoperational. This may occur during rearming, refueling, maintenance down time, or for other reasons. Since the effective range of the Stinger missile is close to that of the Chaparral missile, the Stinger system can temporarily replace the Chaparral system. It is also during these vulnerable periods that Stinger can be utilized as a self-defense weapon. When employed in these situations, the Stinger team should be positioned as close to the fire unit as possible, observing safety restrictions.

STINGER COVERAGE

ATTACK AIRCRAFT

DIRECTION OF CONVOY MOVEMENT

When Chaparral elements are displacing to another location by convoy, they are vulnerable to air attack. Stinger teams must be used to protect these elements on the road. Stinger's quick reaction time can be most valuable to the Chaparral units at this time. Stinger teams supporting an ADA unit in convoy are integrated into the march column. They are positioned at each end of the march column to take advantage of the Stinger missile's head-on engagement capability.

Command and Control

When Stinger teams are deployed away from Chaparral fire units, the teams must establish telephone communications with the nearest fire unit. Information is then relayed to the team by personnel at the fire unit. If the Stinger team is collocated with the fire unit, the radio and TADDS of the fire unit should be used.





SURVIVAL on the BATTLEFIELD

Unless the airspace over the battlefield is denied him, the enemy will attack and harass our ground forces from the air. It is the job of the Stinger team to help deny the enemy use of this airspace. As a result, enemy air and ground forces, supported by sophisticated intelligence gathering and weapon systems, will be dedicated to air defense suppression in an effort to win control of the airspace. The answer to survival on the battlefield is to become invisible and undetectable. This chapter describes the techniques and procedures which you must use to survive on the battlefield.

CONTENTS

COVER

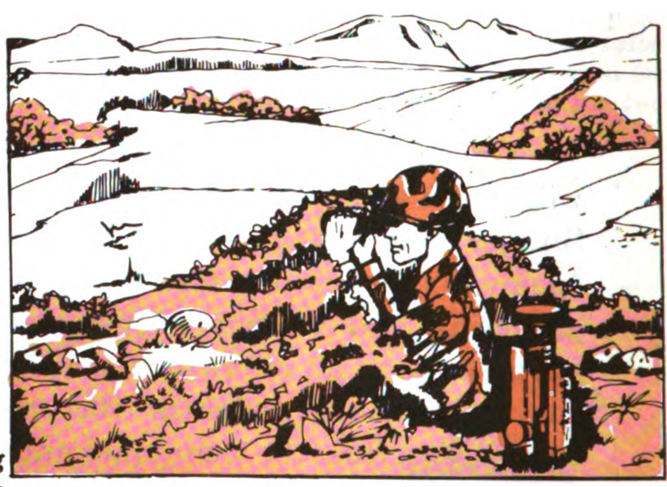
COVER IS PROTECTION FROM THE FIRE OF ENEMY WEAPONS

This fire includes bullets, fragments, flame, nuclear effects, and biological and chemical agents. Cover will also provide protection from enemy observation. It may be natural or artificial.

Natural cover (ravines, hollows, reverse slopes) and artificial cover (foxholes, trenches, walls) protect you from fire. The battlefield provides cover such as rubble, abandoned equipment, and craters. Even the smallest depression or fold in the ground will give you some cover. A 6-inch depression may be enough to save your life under fire. Form a habit of looking for, and using, every bit of cover the terrain offers.

Proper use of the terrain is the key to success for all tactical operations. This means using cover and CONCEALMENT.

CONCEALMENT



CONCEALMENT IS PROTECTION FROM ENEMY OBSERVATION

It is concealment--natural or artificial--that hides or disguises a soldier, vehicle, position, equipment, or route. Concealment includes not only camouflage but also light, noise, movement, refuse, and odor discipline.

Well-concealed vehicles and fighting positions will deceive the enemy as to the team's location. Natural concealment is provided by your surroundings. The best way to use this natural concealment is to leave it undisturbed as you move into an area. Against an enemy who has night vision and other detection devices, darkness will no longer conceal you. To supplement natural cover and concealment found on the battlefield, the team must be proficient in CAMOUFLAGE.

CAMOUFLAGE



CAMOUFLAGE IS MANMADE CONCEALMENT

Camouflage is taking advantage of the natural environment as well as using natural and artificial materials. Used properly, it will disguise the Stinger team and minimize the possibility of detection and identification by the enemy.

If camouflage is required, plan to get it from areas other than your team's position. Camouflage can be made from branches, bushes, leaves, and grass. Attach this material to your vehicle with old communications wire. Live foliage for camouflaging is best, because dead foliage and artificial materials may not blend in well with the natural surroundings. Make sure that the vegetation MATCHES what is naturally in your area. Detailed camouflage techniques are found in FM 5-20.

Pattern paint your vehicle: TC 5-200 tells you how.

Camouflage nets are excellent if sited properly. A vehicle in an open field under a camouflage net is easily seen (though it may not be identifiable). That same vehicle between two trees under a camouflage net will probably not be seen.

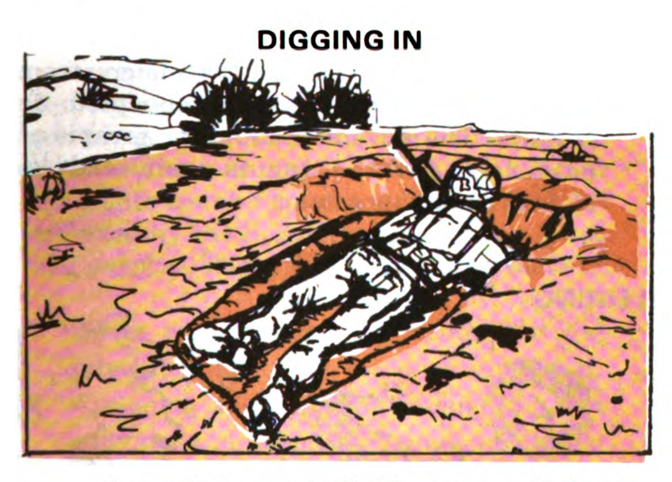
The lightweight screening system (LSS) is described in TRADOC Bulletin No. 6, and TM 5-1080-200-10. Each Stinger team is authorized an LSS by TOE.

A well-sited, pattern-painted vehicle will have its camouflage improved by erecting the lightweight screening system. The LSS further reduces visibility. The LSS also defeats radar by scattering and absorption. Stainless steel fibers in the plastic garnish material absorb some of the radar signal and reflect most of the remaining signal in all directions. The result is only a small percentage of the signal returns to the radar for detection.

FORTIFY YOUR POSITION

Use of field fortifications reduces damage to materiel and injury to Stinger team members. The Stinger team fortifies its position to the extent possible. With the short period of time the team usually remains in a position and only two team members to do the work, construction of fortifications is limited. Fortifications are started as soon as practical upon arrival in a new position and are improved throughout the team's stay in that position.

DIGGING IN



At a minimum, individual prone shelters are constructed for each team member.

> ***WARNING***
>
> **DO NOT FIRE STINGER FROM A FOXHOLE.**

The soldier begins a foxhole as a hasty position for basic protection. As time permits, he improves the foxhole by completing these tasks:

- **Digs the hole deeper.**
- **Builds a protective barrier, if natural cover is not available.**
- **Finishes clearing fields of fire.**
- **Camouflages position.**
- **Builds overhead cover.**

Although it is unlikely that the Stinger team will have to fight enemy infantrymen, the protection afforded by the foxhole will be greatly appreciated if enemy artillery or rocket fire is received on or near the position.

MAKING FORTIFICATIONS EASIER

Select positions that are out of sight of enemy ground observation (e.g., the reverse slope of a hill rather than its crest). The same barrier to enemy observation also provides a barrier to enemy direct fires.

Look for areas that provide natural protection. Terrain irregularities (such as defiles or mounds) provide initial fortifications that can easily be completed with sandbags or other fortifying materials.

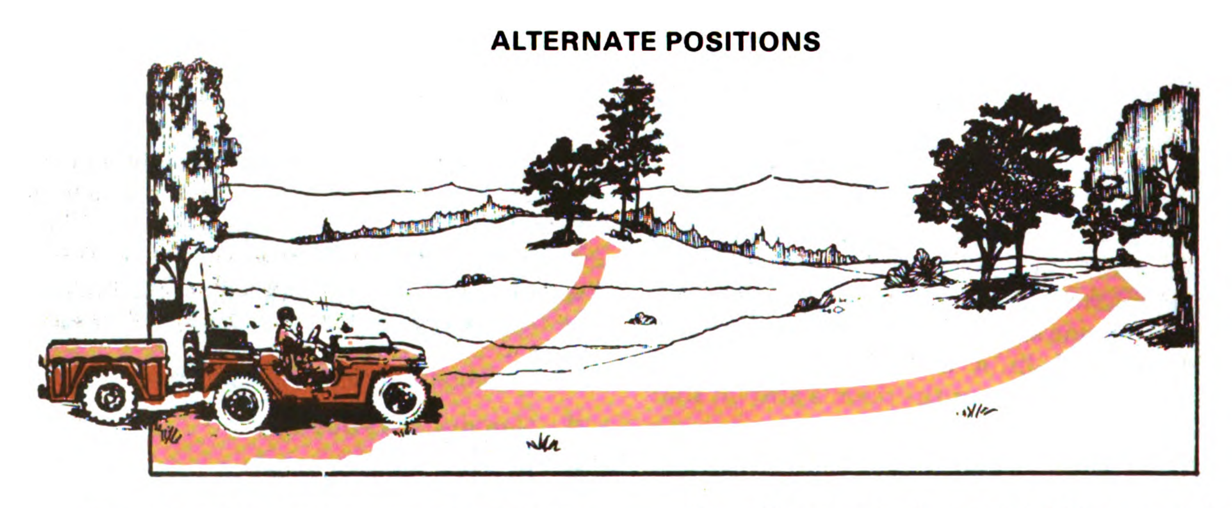
Obtain dirt that is some distance away from the position to construct your fortifications.

Camouflage the fresh dirt to prevent pointing out the position. Field fortifications should complement camouflage, not degrade it. FM 7-7, The Mechanized Infantry Platoon and Squad, and TRADOC Bulletin No. 9, Infantry Fighting Positions, tell you all about foxholes.

THINGS TO DO TO SURVIVE

In addition to digging-in and avoiding detection, the following measures will help you to survive.

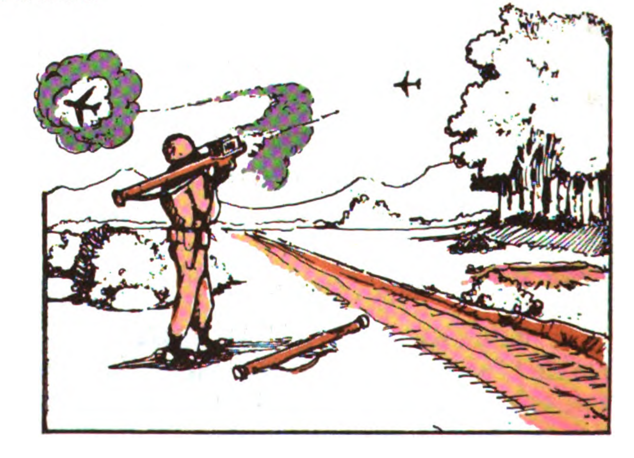
ALTERNATE POSITIONS



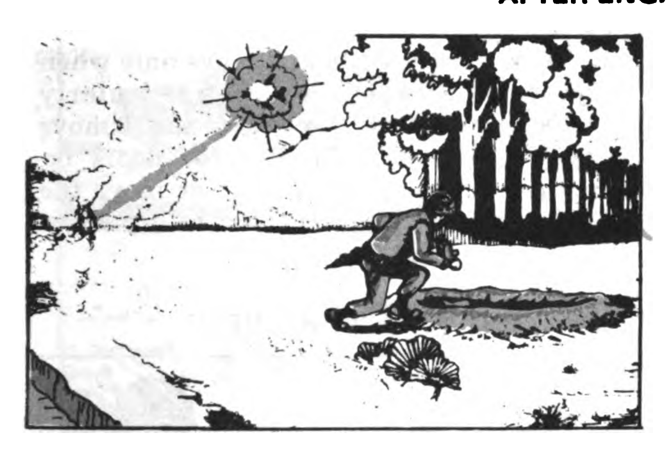
One of the best ways to survive is to keep the enemy confused as to the location of Stinger. Move often. When changing positions, it is not necessary to move far. Alternate positions can be selected within a short distance (at least 200-300 meters) from the primary position and occupied as required. The movement should be as rapid as possible so that the team is again ready to engage enemy targets.

AFTER FIRING

Continue to engage any other enemy aircraft. However, if there are no other enemy aircraft to be engaged, move to an alternate position as quickly as possible.



AFTER ENGAGEMENT



In forward areas, you should move quickly so you can stay alive to fire again. Enemy artillery or ground forces may see the missile signatures and locate your position.

LOCAL SECURITY AGAINST GROUND ATTACK

Stinger teams are usually deployed behind the FEBA. They maintain close coordination with maneuver units and must depend on the supported unit for protection against ground attack. At night and during foul weather, Stinger teams should move into positions within a unit's defense perimeter. When Stinger teams come under enemy ground attack, the teams may have to defend themselves with their small arms. When Stinger teams are outside of defense perimeters, they are vulnerable to attack by guerrillas and other enemy elements operating behind friendly lines.

COMMUNICATIONS SECURITY

Communications security (COMSEC) denies or delays unauthorized persons from gaining information of value from monitoring communications. Preventive electronic counter-countermeasures (ECCM) are used by the Stinger team to accomplish this purpose. These ECCM measures include:

- Using authentication to insure that the other communicating station is authorized.
- Assigning and changing frequencies and call signs to conceal identification and disposition of tactical units.
- Restricting the use of radio transmitters.
- Enforcing net discipline and insuring proper radiotelephone procedures. All stations operating within a net must use authorized prosigns and prowords and limit transmission to official traffic.
- Selecting a radio site with a hill or other obstacle between it and the enemy.
- Organizing messages before transmission to reduce transmission time.

Stinger team personnel can expect that the enemy will attempt to disrupt its radio communications through an intensive jamming effort. Jamming is the deliberate radiation of energy to prevent or degrade the receipt of information by a receiver. It is the deliberate production of interference to your radio. You can liken it, in a sense, to static on a TV set. The static interferes with our receiver, in this case, the TV set, but does not interfere with the transmitter. Antijamming procedures used by the Stinger team include:

Recognize Jamming. If interference is heard, do not immediately assume jamming. Symptoms of jamming are often similar to

other types of radio interference. Try to determine what is causing the interference. Disconnect the receiver antenna to see if a signal is being generated internally by the receiver. If the interference decreases with the antenna removed, the interference is probably external and may be jamming.

Continue to Operate. Radio operations should continue in a normal manner once jamming has been identified. This is to prevent the jammer from learning the effect of his jamming.

Reduce Transmit Power. Transmitting on low power reduces the opportunities for the enemy to hear the transmission. Use only enough transmitter power to be heard within the net but not enough to be heard by the enemy. Some radios (e.g., AN/PRC-77) do not have multiple power settings. To reduce power, the radiation pattern must be modified. This can be easily done by carrying the radio upside down with the antenna tip a foot above the ground. This technique will usually provide a good strong signal within a radius of 5 kilometers.

Change Frequencies. As a last resort and when authorized, change to an alternate frequency.

Report Jamming. As soon as jamming is recognized, a report should be sent to the next higher headquarters. Use an alternate means of communications for this report. A jamming report format is included in the CEOI or your unit tactical SOP.

LIGHT DISCIPLINE

During periods of reduced visibility, any light (even filtered flashlights and burning cigarettes) can be seen for great distances. At such times the use of lights must be strictly controlled. Lights needed for maintenance and other activities must be shielded from enemy view.

NOISE DISCIPLINE

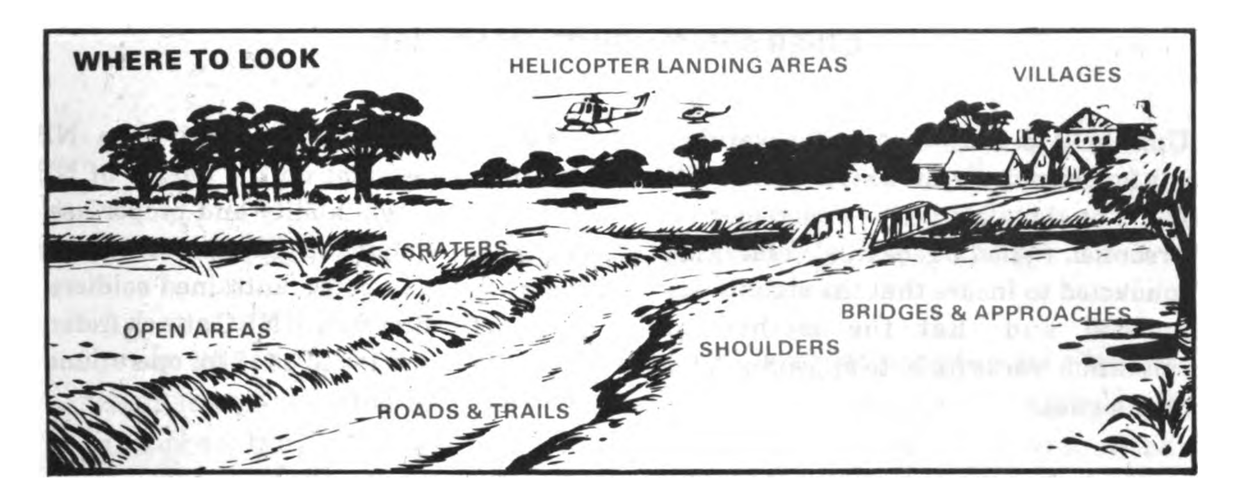
Soldiers must talk and move only when necessary. At night, it is particularly important to talk in a low voice and to move slowly. Don't slam hatches or doors on armored vehicles. Don't start or move the team vehicle unless it is part of a plan or tactical operation.

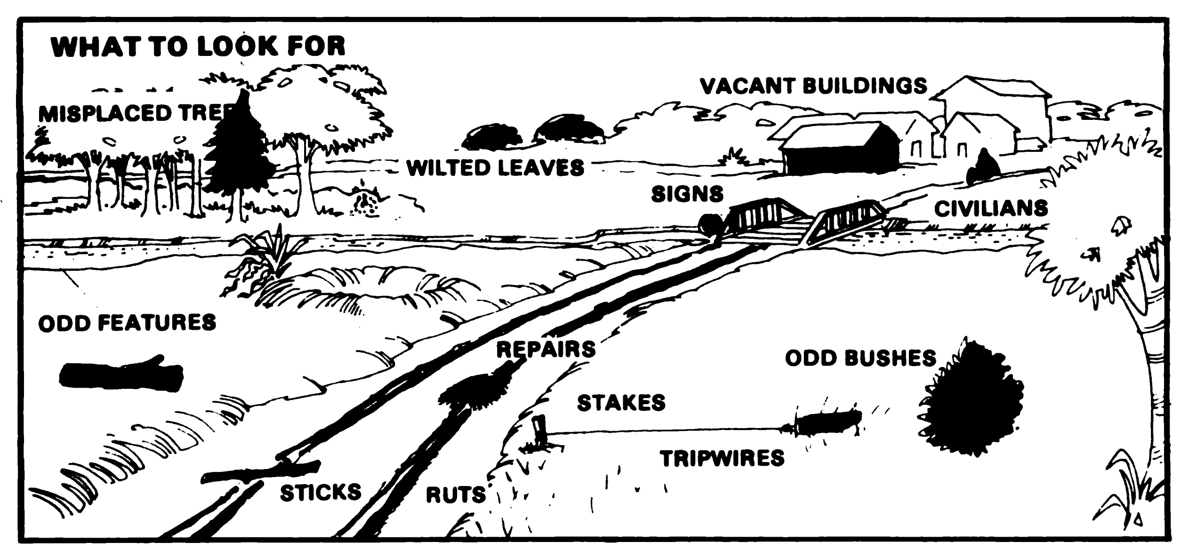
MINE WARFARE



Every soldier should be aware of the destructive potential of enemy mines. Mines can inflict severe injury to troops and heavy damage to vehicles and equipment. They can effectively prevent troops from entering certain areas and channel them into areas with concentrated enemy fire. Supply lines may be disrupted and convoys forced to bunch together due to damaged vehicles.

Stinger teams supporting maneuver units frequently find themselves alone in unfamiliar areas. Their chances of finding enemy mines are increased. For this reason, team chiefs and gunners should take protective measures, be aware of likely mine locations, and be able to recognize the tell-tale signs of enemy mines.





Signs indicating possible mine locations include but are not limited to:

- Mud smears, grass, sticks, dirt or other unusual material on roads.
- Fresh asphalt or other signs of road repairs.
- Markers, stakes, or other signs used to identify certain areas.
- Wires leading away from roads.
- Dead vegetation in small or scattered areas.
- Civilians avoiding certain areas.

Stinger personnel should avoid suspected mined areas and move to a nearby position to accomplish their mission. If, however, your team encounters a mined area, do not panic. Notify your next higher level of command immediately, as specified in your unit SOP. Probing for mines is a tedious process and should not normally be attempted by Stinger personnel. ***Do not probe for mines with metallic objects, as some mines are triggered magnetically.*** Additional information on mine warfare is contained in FM 20-32, Mine/Countermine Operations at the Company Level.

OTHER SURVIVABILITY MEASURES

Unit SOP prescribes specific warning signals for ground, air, air assault, and NBC defense. The signals must be understood by all personnel. Periodic rehearsals and drills are conducted to insure that the signals are understood and that the method of dissemination works (refer to appendix A for warning signals).

How Stinger teams survive an NBC attack is dependent on the degree of NBC training and availability and proper use of protective equipment. The nature of NBC operations may cause untrained soldiers to panic at the first sign of NBC attack (refer to appendix C and to FM 44-18 for operations in NBC environments).

REMEMBER

- Stay alert---see the enemy first. Seeing him first gives you the edge in the engagement. Don't lose sight of him.
- Select a position that is hidden from enemy ground observaton.
- Move into positions during darkness.
- Take advantage of terrain to provide cover and concealment for the weapon.
- Do not expose anything that shines. Reflection of light from a shiny surface attracts attention and can be seen for great distances.
- Use garnish netting, pattern painting, and natural materials to camouflage the position.
- Blend equipment into natural background.
- Erase and cover tracks.
- Keep position litter-free. Be sure to replace dunnage (packing material) and barrier bags from the missile-round container into the container after the missile-round has been removed.
- Report detected mines immediately to the next higher level of command in accordance with unit SOP.



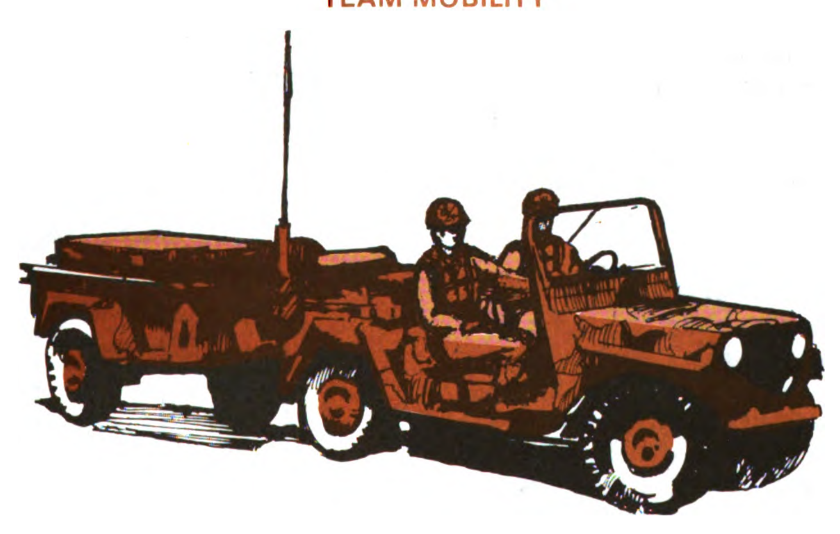


MOBILITY and COMBAT LOADING

In addition to being able to ***shoot*** and ***communicate,*** the Stinger team must also be able to ***move.*** Because the Stinger weapon is a man-portable air defense missile system, both vehicular and dismounted march deployment must be considered. This chapter discusses mobility, vehicular combat loading, and dismounted march loads in which Stinger team personnel should be proficient.

CONTENTS

TEAM MOBILITY



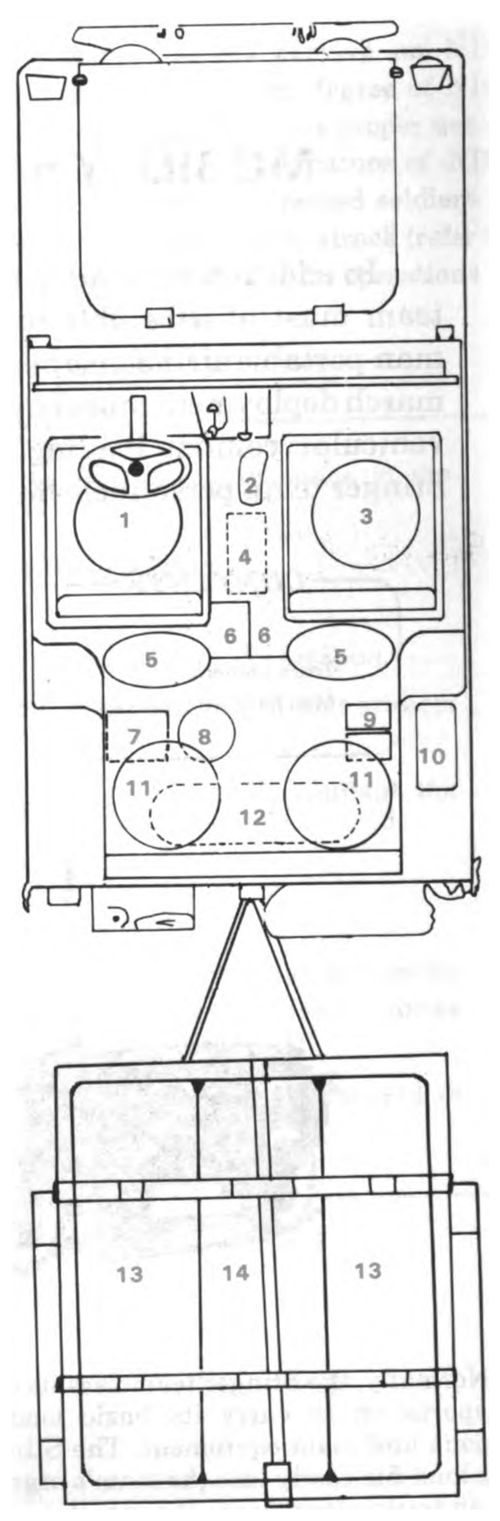
Normally, the Stinger team uses its own transportation to carry its basic load of weapons and team equipment. The Stinger basic load fits easily into the team's organic 1/4-ton trailer. In general, the vehicles carry shipping and storage containers in the trailer with all TOE items carried in the truck. The 1/4-ton truck and trailer provide limited mobility in the forward area.

NOTE: Teams assigned to the Airmobile Division are not equipped with a vehicle.

VEHICLE LOADING PLAN

1 TEAM CHIEF
2 BINOCULARS
3 GUNNER
4 TADDS
5 PACK (2)
6 PROTECTIVE MASK (2)
7 IFF
8 WIRE REEL *
9 TELEPHONE (2) *
10 RADIO
11 SLEEPING BAG (2)
12 DECONTAMINATION KIT
13 WEAPON-ROUND (4)
14 MISSILE-ROUND (2)

*Under rear seat if decontamination kit leaves sufficient space.



During mobile operations with mechanized forces, Stinger teams may not be able to keep up with their supported unit; e.g., a company team. Also, Stinger teams may be vulnerable to hostile ground fire. When Stinger teams are to support a mechanized element, the maneuver commander may provide teams with tracked transportation; e.g., armored personnel carrier(s). The Stinger team may have to share a ride with other troops in the APC.

Changing the mode of transportation of the team includes providing space for the basic load of Stinger weapon-rounds. Also, space and power must be provided for the team's radio. If the team shares a ride with an infantry squad, there is insufficient room for the complete basic load. The load may have to be split into several carriers (refer to FM 44-18 for details.)

MAN PACK STINGER LOAD

The Stinger team sometimes dismounts to support maneuver elements in difficult terrain. The team chief must coordinate with the supported unit commander to solve the problems of carrying Stinger and guarding Stinger equipment left behind.



The team is limited to carrying only two Stinger weapons. In addition, a team radio (man-packed), extra BCUs, individual weapons, binoculars, etc., must be carried. The amount of equipment team members must carry limits their range and mobility during dismounted operations. Weights may vary according to what items are carried. Under these conditions, it is essential that weight be minimized and the load balanced. Multiple sling loads are difficult to carry for extended periods. Both Stinger and the M16 rifle are sling-carried weapons. (See page 10-4 for sample Stinger march-load and weight distribution allocations.).



Other soldiers may be detailed as ammunition bearers to carry the remainder of the basic load.

SAMPLE MARCH-LOAD AND WEIGHT ALLOCATION

ITEM	WEIGHT IN POUNDS*	
	GUNNER	TEAM CHIEF
Clothing	8.12	8.12
Personal Equipment & Existence Load		
Frame, pack, including lower back, shoulder, & waist straps	3.10	3.10
Pack, medium, combat, field	2.46	2.46
Canteen (filled) w/cup and cover	3.60	3.60
Intrenching tool w/carrier	2.52	2.52
Individual equipment belt, first aid packet w/case & suspenders	1.59	1.59
2/3 ration	3.50	3.50
Poncho liner	1.60	1.60
Toilet articles	1.00	1.00
Personnel Armor		
Helmet w/liner	3.44	3.44
Armor vest	9.30	9.30
Individual Weapon & Ammunition		
M16 rifle w/sling & 1 magazine (30 rds)		7.91
Pistol w/holster, & 3 magazines (21 rds)	4.59	
NBC Protection		
M17A1 mask w/carrier	2.97	2.97
Suit, chemical, protective w/gloves & hood	3.78	3.78
Stinger System Equipment		
Weapon-round w/BCU	34.70	34.70
BCU spare	1.70	1.70
IFF belt pack w/cable	5.80	
Other TOE Equipment		
AN/PRC-77 radio w/battery		23.50
Binoculars w/case		2.86
Compass, magnetic w/case		.43
Sunglasses w/case	.30	.30
TOTAL WEIGHT	94.07 lbs	118.38 lbs

*Typical weights extracted from FM 21-15.



CHAPTER

SYSTEM SUPPORT

Stinger teams must know where to obtain needed repair and service for their weapon system and training equipment. They must know what maintenance is authorized at their level on this equipment. Additionally, Stinger teams must know who to contact for needed rations and supplies when attached to maneuver elements. This chapter discusses these points and outlines the maintenance and logistics support concept for Stinger teams.

CONTENTS

ORGANIZATIONAL MAINTENANCE

The Stinger weapon is issued as a certified round of ammunition. Stinger weapon maintenance is done only at organizational and depot levels. There are no intermediate levels of maintenance. Organizational (user) maintenance is done by the Stinger team. Weapons that cannot be repaired at organizational level will be exchanged for operational weapons at the ammunition supply point (ASP). User maintenance consists of preventive maintenance (PM) and replacement of certain parts. Maintenance tools and equipment are limited to cleaning and painting materials and the TL-29. The TL-29 is a combination flat blade screwdriver and knife. No special tools, test equipment, or training are required to perform this maintenance.

Examples of PM performed by team members are:

Stinger Weapon

- Correct visually detected faults on the exterior.
- Replace selected external components, such as sling assembly, protective end caps and the eyeshield.

IFF Interrogator

- Correct visually detected faults on the exterior.
- Clean periodically.
- Spot paint.

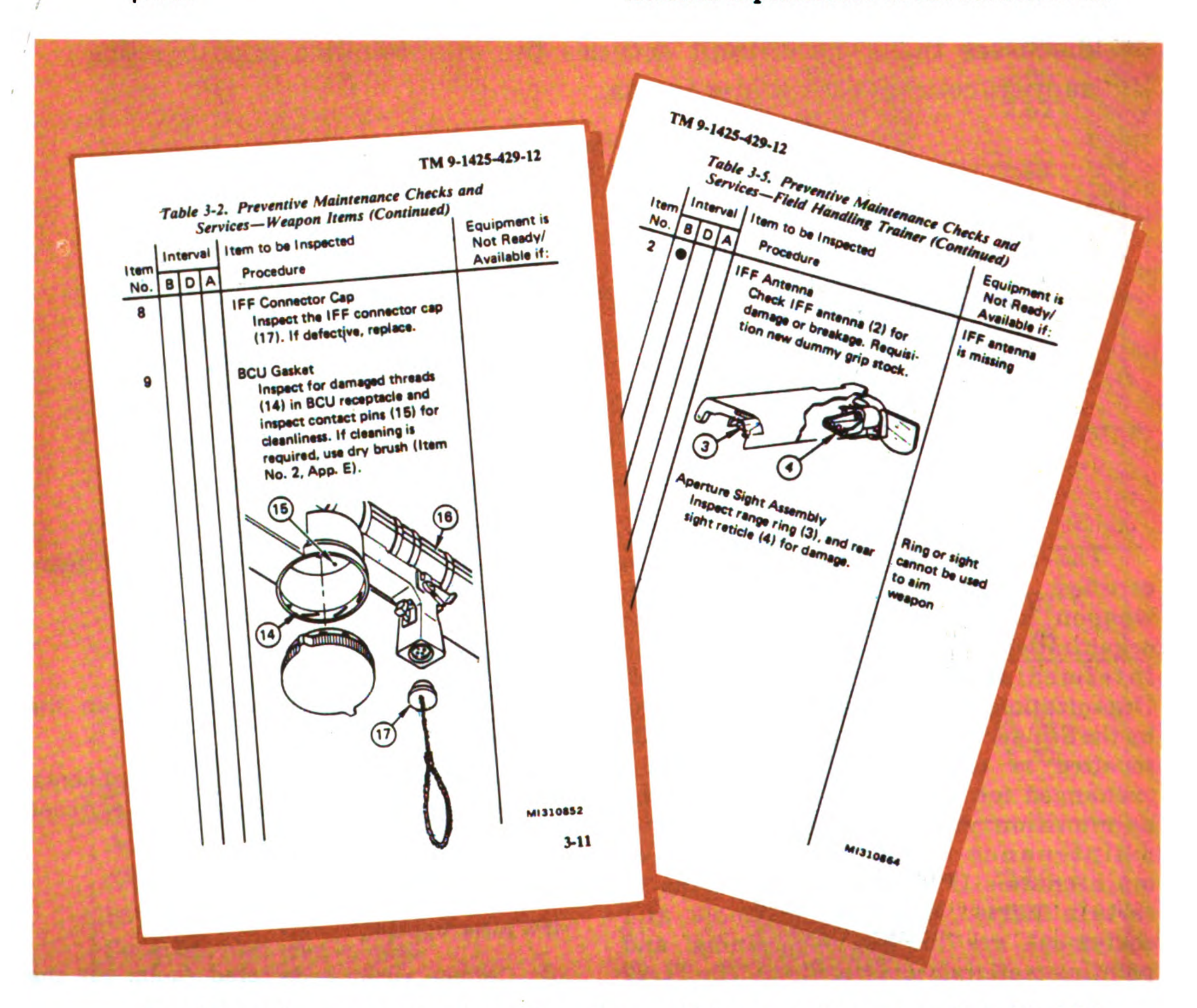
Shipping & Storage Containers

- **Metal**
  - Check humidity indicators.
  - Inspect exterior and interior for leaks, deterioration, damage and loose or missing parts.
  - Repaint missing or illegible markings.
  - Tighten or replace loose or missing parts.
- **Wooden**
  - Inspect exterior for damage or leaks.
  - Replace broken or missing binding wires.

Transport Harness

- Oil fasteners occasionally (light oil).
- Clean periodically.

PM on the IFF programmer and Stinger trainers is performed at the section level.



TM 9-1425-429-12

Table 3-2. Preventive Maintenance Checks and Services—Weapon Items (Continued)

Item No.	Interval B	Interval D	Interval A	Item to be Inspected / Procedure	Equipment is Not Ready/Available if:
8				IFF Connector Cap Inspect the IFF connector cap (17). If defective, replace.	
9				BCU Gasket Inspect for damaged threads (14) in BCU receptacle and inspect contact pins (15) for cleanliness. If cleaning is required, use dry brush (Item No. 2, App. E).	

3-11

TM 9-1425-429-12

Table 3-5. Preventive Maintenance Checks and Services—Field Handling Trainer (Continued)

Item No.	Interval B	Interval D	Interval A	Item to be Inspected / Procedure	Equipment is Not Ready/Available if:
2	●			IFF Antenna Check IFF antenna (2) for damage or breakage. Requisition new dummy grip stock.	IFF antenna is missing
				Aperture Sight Assembly Inspect range ring (3), and rear sight reticle (4) for damage.	Ring or sight cannot be used to aim weapon

Specific maintenance checks and services on Stinger equipment are listed in TM 9-1425-429-12 and TM 9-6920-429-12. Careful attention should be given to the SAFETY precautions listed in these technical manuals.

STINGER SYSTEM TACTICAL EQUIPMENT

WEAPON- and MISSILE-ROUND

Operator/user maintenance of the Stinger weapon-and missile-rounds is performed by the individual teams. This maintenance consists of correcting visually detected faults on the exterior of the equipment. Repair parts required to perform the maintenance are kept in the authorized stockage list (ASL) of the direct support unit (DSU) to which the Stinger section is assigned.

In peacetime, missile-rounds found unserviceable by surveillance checks are returned to depot for repair or disposal.

In combat, missile-rounds which do not work will be destroyed. Should a weapon-round malfunction during engagement, the round and gripstock are considered unserviceable. After following appropriate safety procedures, the gripstock is removed and returned to the missile DSU. Procedures for handling hangfires, misfires, and duds can be found in chapter 3.

A BCU which does not activate is discarded by the user. Activated BCUs are also discarded by the user.

IFF INTERROGATOR and PROGRAMMER

The IFF interrogator has its batteries recharged and is reprogrammed by the section headquarters. The reprogramming for mode 4 is done using the IFF programmer. With precharged batteries, the interrogator can be programmed and checked out within 10 minutes. User maintenance consists of visual inspection of the exteriors for damage, periodic cleaning and spot painting. Unserviceable items are turned in to the DSU for replacement. The section maintains operational float interrogators for exchange with the teams.

TRANSPORT HARNESS

There is no maintenance on this item other than normal routine preventive user maintenance. If the straps are torn on the transport harness, it may be taken to the DSU and sewn. If a buckle is bad, it will be turned in as unserviceable. A new buckle will be issued.

SHIPPING and STORAGE CONTAINERS

Containers which cannot be repaired at the user level are turned in to the DSU for replacement. A damaged container is exchanged for a new container. Do not use the weapon if the container has been dropped from a distance of 5 feet or more.

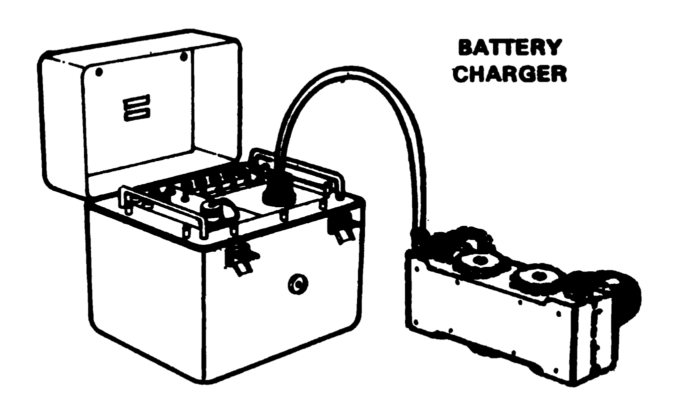
TRAINING EQUIPMENT

Stinger training equipment consists of the training set guided missile M134 and the field handling trainer M60. These items require organizational maintenance performed on them similar to the tactical equipment. In addition:

- If the tracking head trainer (THT) or any portion of the training set requires repair beyond the organizational capability, it will be turned in as unserviceable. A float training set is then issued to the unit.
- If the field handling trainer (FHT) is defective and cannot be repaired by replacement of components at the user level, it will be turned in as unserviceable. A serviceable FHT is then issued to the unit.

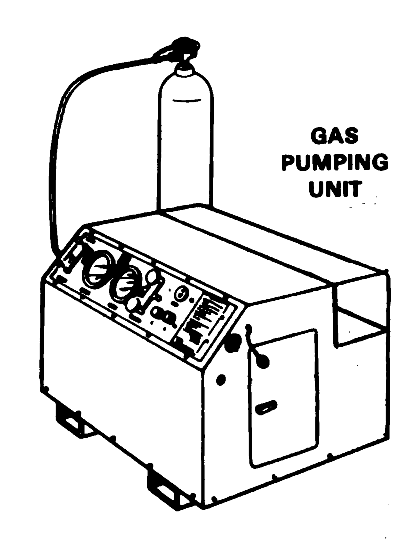
TRAINING SUPPORT EQUIPMENT

Stinger training support equipment consists of the battery charger and the gas pumping unit (GPU). This support equipment is maintained at the DSU.



The battery charger is used to recharge the five trainer batteries used with the tracking head trainer. The battery charger includes a carrying case to complete the equipment required to charge the trainer batteries. After 16 full cycles on a battery, the battery needs recharging.

The GPU is used to refill the gas bottle in the trainer with argon gas. After approximately 80 full cycles, the gas bottle needs recharging. The training set is returned to the DSU for recharging the batteries and gas bottle.



Operating instructions and maintenance of training support equipment is found in TM 9-6920-429-12.

COMBAT SERVICE SUPPORT

Stinger teams supporting companies, batteries or troops request supplies through their section headquarters. The Stinger section chief will prearrange this support when he orders his teams to support these units. Items which teams may need include: rations, POL, clothing, spare parts, and personal health items.

Combat service support for the section/team is provided by the combat support company, headquarters company, or headquarters and service battery - depending on the type of battalion to which the section is assigned.



PART

STINGER TRAINING

CHAPTER

TRAINING STINGER TEAMS

To be effective, training must prepare Stinger teams to do their jobs in combat. To have proficient Stinger teams, adequate time must be made available to conduct realistic training in tactical field exercises. Enough time must also be made available to conduct refresher training in weapon handling and practice engagements. A training program for Stinger personnel must be well planned. It must also remain flexible. Mission needs may dictate that a short intensified program be conducted. However, the goal is still to develop and maintain Stinger gunner and team skills at a high level. This chapter discusses some factors to consider in training to reach that goal. Planning and preparing military training are covered in FM 21-6, How to Prepare and Conduct Military Training.

CONTENTS

The Stinger platoon's parent unit commander has the authority and responsibility for planning, directing, conducting, and supervising training. He trains his teams to the highest degree of operational readiness allowed by the availability of:

- Personnel
- Equipment
- Time
- Funds
- Facilities
- Operational requirements
- Installation support requirements

He accomplishes this by using his officers and noncommissioned officers to schedule and conduct planned training.

TRAINING ASSESSMENT

The commander assesses the proficiency of the unit and individual based on:

- Personal observation
- Sampling techniques
- Performance tests
- Field exercises
- Soldier's skill qualification tests
- Army training and evaluation program

This assessment is essential to the success of the training program for Stinger teams and is used to identify training needed. The following procedures will assist the commander in making the assessment:

CURRENT PROFICIENCY

To determine each individual's proficiency:

- Analyze the experience level, including results of previous training of the individual team member, in his assigned position.
- Evaluate the overall training level of the section. Conduct maintenance inspections, equipment operating tests, operational readiness training tests (ORTT), field exercises, and team quick-reaction drills.
- Review results of the last SQT (skill qualification test) and ARTEP (Army training and evaluation program) to see if any deficiencies surface because of poor team performance.

TRAINING STANDARDS

To determine what training will be necessary to meet required training standards:

- Compare results of the gunner's current proficiency with the required training standards contained in the soldier's manual.
- Find out the levels of training required to bring personnel up to the proper standards.

TIME AVAILABLE

To determine how much time is available to achieve the required standards:

- Examine the section's overall mission requirements and other obligations.
- Evaluate how much training needs to be done.



RESOURCES REQUIRED

To determine what resources are required to train members:

- Refer to Chapter 13, "Stinger Training Devices and Materials," for innovative solutions to overcome possible shortfalls.
- Refer to results of the latest ARTEP as an indicator of training resources required for further training.
- Refer to unacceptable scores received on the latest SQT.
- Review previous training experiences of the section indicating previous resources used.

RESOURCES AVAILABLE

To determine what resources are available to conduct gunner training:

- Inventory section equipment and evaluate its readiness.
- Determine what assistance is available from supporting units and higher headquarters.
- Examine available training facilities.
- Reconcile all considerations. Differences between resources required and resources available will affect both the time required to conduct the training and the section's ability to meet the required standards.

PERFORMANCE-ORIENTED TRAINING

Training of both individuals and teams must be ***performance-oriented.*** To accomplish this, the commander/trainer must ask three questions when making a training program:

1. Mission/task. What is the soldier/team expected to do in combat?
2. Conditions. Under what conditions is the mission/task to be performed?
3. Standards of Performance. How well is it to be done?

EXAMPLE

TASK-Select and occupy a position.

CONDITIONS-Team is given location, primary sector of search, and a 1:50,000 map of the area.

STANDARDS-

- Team chief conducts ground reconnaissance while the gunner maintains a ready status.
- Team chief selects primary and alternate positions on the ground.
- Team occupies primary position within 30 minutes.

Selected positions-

- Are within given approximate location.
- Have clear fields of fire.
- Have all-around observation if possible.
- Have access and egress routes.
- Have 50-meter backblast area.
- Take advantage of available cover and concealment.

The tasks, conditions, and training standards of proficiency are specified in appropriate training documents as follows:

Soldier's Manual (SM). The SM identifies, defines, and describes individual tasks and standards of performance necessary for success on the battlefield. These tasks and standards, along with training guidance, provide the basis for training and evaluation of the individual soldier.

Commander's Manual (CM). The CM lists for the training manager the tasks the soldier must master to be proficient in his job and survive in combat. It also lists the source and location of training and supplemental training materials.

Job book (JB). JBs enable NCOs to monitor and keep a record of critical and common task proficiency for each of their soldiers. JBs are issued to each NCO supervisor for all soldiers in skill levels 1 and 2 under his supervision.

Skill Qualification Test (SQT). The SQT is a three part performance test designed to measure a soldier's ability to do his job. Stinger team members must also take SQTs to qualify them for promotion.

The SQT consists of three components: skill, hands-on, and job site (commander's certification). The skill (or written) component is like any written military test. It consists of a number of questions with multiple choice answers. The hands-on component requires a scorer to watch the soldier perform a required task in a simulated job situation. In the job site component, commander and supervisor are required to certify whether or not the soldier has satisfactorily performed a given task.

Army Training and Evaluation Program (ARTEP). An ARTEP provides guidance for collective training and evaluation. ARTEP identifies the mission, tasks, and conditions under which the tasks are to be performed, and the proficiency of each unit.

STINGER TRAINING PROGRAM

The goal of the annual Stinger training program is to maintain Stinger team, section, and platoon skills throughout the training year. The program achieves its goals through continuous reinforcement training. It is composed of:

- Weekly Quick-Reaction Drills
- Quarterly Moving Target Simulator Training
- Quarterly Simulator Device Firing
- Annual Live Firing

This program is designed to prevent your skills from deteriorating with time. It provides a mix of crew drill training, simulated firing, and live firing. Each type of training reinforces the other, and is an essential part of the overall training. The training program is based on two principles:

- Train from simple to complex. Begin with simple drill exercises using simulation devices and work to complex ARTEP evaluations. Precede live firings with firings of simulation devices.

- Train engagement skills repetitively. The skills taught in each step are repeatedly used in succeeding steps.



STINGER TRAINING GUIDANCE

Schedule Training

Schedule training well in advance and organize it to take advantage of existing time and resources. Training should be scheduled for a whole year. Detailed monthly training schedules should be prepared. This tells both leaders and soldiers how time is used, where training takes place, and the subject being taught. Also, it tells who is responsible for the training, what equipment is needed, what references are available, and what, if any, coordinating instructions are necessary. Prepare these schedules as far in advance as possible to insure all teams and individuals are prepared for training.

Train Under Realistic Conditions. Combat is hard to simulate, but you cannot train good Stinger teams without simulating the pressures, noises, or other problems experienced in combat.

Conduct Training With Supported Units. Whenever possible, arrange to conduct tactical training with the units you will support in combat. Stinger teams must habitually work with the units they support.

Concentrate Training in Areas Where It Is Most Needed. Do not waste time by training in the skills your teams and soldiers have already mastered. Know where the weak spots are and train to correct them.

Cross Train All Team Members. When each team member becomes proficient in his own job, train him to do the other team member's job. For example, train the gunner to operate the team radio.

INDIVIDUAL and TEAM TRAINING

The soldier's manual is a key element in individual training. It serves as a basis for the SQT. By studying his manual, a Stinger team member can determine what makes up his SQT and how to prepare for it. The Stinger soldier's manual, FM 44-16S, identifies those tasks needed to refine an individual's basic skills.

Mastering individual skills is the beginning of an effective Stinger team. Proficiency in these tasks insures that Stinger teams will be able to meet the threat's challenge. The tasks are broken into two groups. The first group is common tasks. These tasks must be mastered by all Stinger personnel. The second group lists those tasks required by duty position or proficiency level. When individual standards are met, the Stinger team and section must function together where Stinger gunnery and tactics are combined. Only after all Stinger personnel have been trained to perform these tasks at the required standards will the teams be able to effectively accomplish their mission on the battlefield.

The training required for specific Stinger tasks can be found in the appropriate chapter or appendix of this manual.

TACTICAL TRAINING

QUICK-REACTION DRILLS

Quick-reaction drills develop team work. They are used to develop quick reaction where time is important. An example is a situation where a team must defend against aircraft making an attack against a convoy. Teams should practice the drills with the same precision as a well-executed football play. The drills are easy to prepare, can be conducted almost anywhere, and need last only 30 to 40 minutes. Field handling and quick-reaction drills are described in chapter 17.

TERRAIN WALK



The terrain walk is a proven method of training. When used, it should be completed with leaders first and then with troops. It involves nothing more than a leader --any leader -- taking his men on a tour (by foot or vehicle) over a predetermined route and discussing applications of various tactical principles and techniques along the route.

The object is to give the team members an appreciation for various tactics or techniques in the employment of Stinger. An informal, two-way question and answer procedure is the most productive.

Few methods of training will implant tactical concepts better than a well-conducted terrain walk. For example, this terrain walk can be used to point out how a Stinger team can support a company team on a forward movement.

TERRAIN MODEL EXERCISE



The principal purpose for conducting a terrain model exercise is to reinforce the training each Stinger team member received in the classroom--prior to undergoing a practical exercise in the field. The terrain model exercise is really a small tactical exercise in which each man can see how he fits into the whole picture.

The terrain model exercise permits the leader to:

- Discuss the roles of the supported unit, adjacent units, and other units connected with the field exercise.
- State the mission of the section and teams.
- Discuss unit SOPs for actions on contact, security, occupying positions, etc.
- Ask questions of each team member.
- Point out terrain features which attack helicopters can slip behind and then attack friendly armored vehicles.
- Answer questions and clear up any misconceptions.
- Use subscale model vehicles.

FIELD TRAINING EXERCISE

Another way to train the teams and section is the field training exercise. This exercise should be conducted under complete tactical conditions so that all aspects of training are exercised. The field training exercise obviously requires more training and preparation than the previous methods. It requires a scenario, an operation order, and control personnel. The best way to start the exercise is with an alert and movement to an assembly area. From this point it can take any form you desire, depending on your training needs. Chapter 19 tells you how to plan for, conduct, or participate in a field training exercise.

CHAPTER

STINGER TRAINING DEVICES and MATERIALS

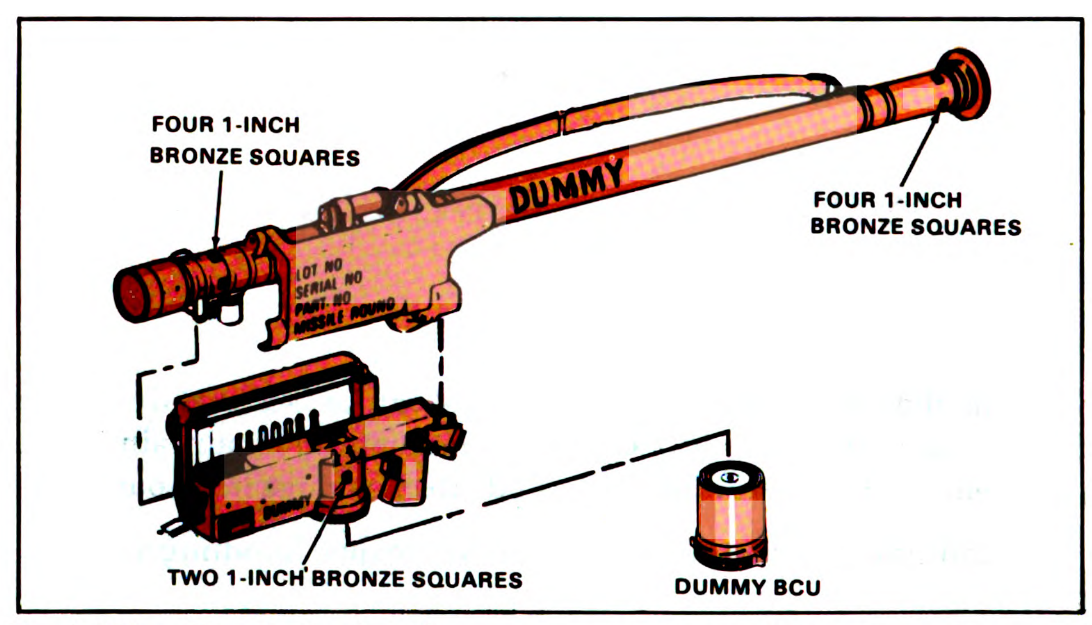
This chapter describes the devices that can be used to train and test Stinger gunners. These devices serve to promote and maintain gunner proficiency, shorten training time, and effect savings in resources.

A training program should emphasize weapon handling and firing procedures to develop and maintain gunner proficiency at a high level. A number of training devices have been developed which, if used properly, can add realism to the training program. The use of these devices is less costly than conducting live firings and permits training to be conducted at the home station.

CONTENTS

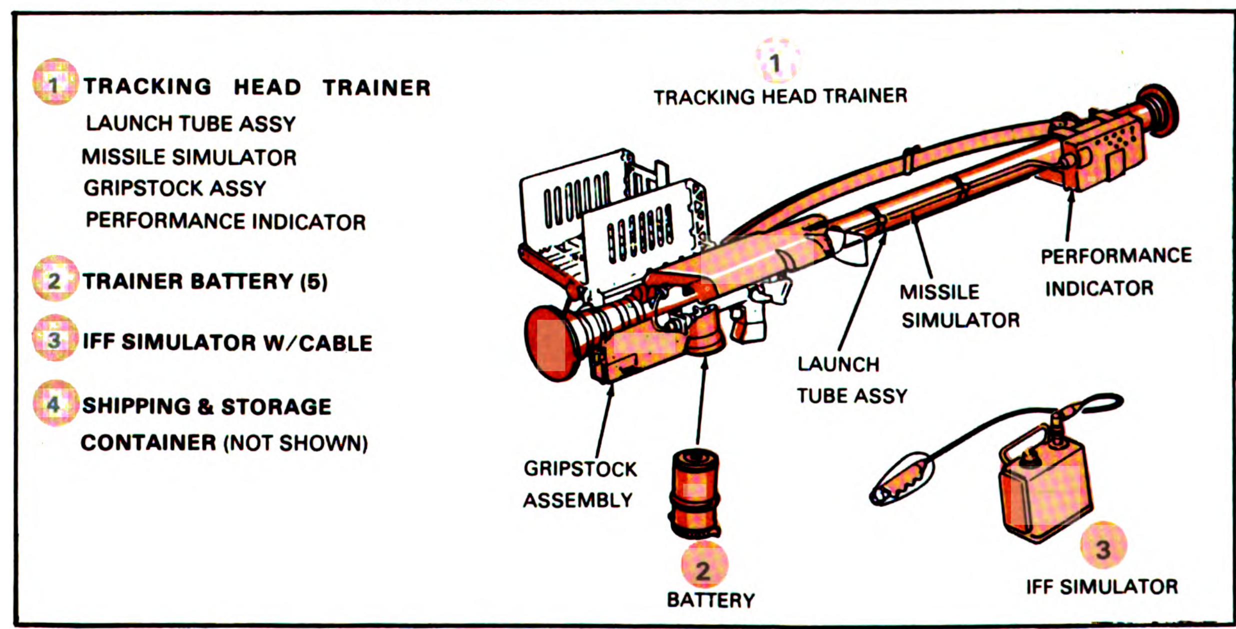
FIELD HANDLING TRAINER (FHT) M60

The Stinger gunner uses the field handling trainer (FHT) to practice basic manual skills of weapon handling, operation, sighting, and ranging. The FHT can be used to visually track actual aircraft or radio-controlled targets. It also allows the gunner to practice mating/removal of the gripstock and insertion/removal of the BCU.



The field handling trainer has the same size, weight, and external appearance as the Stinger weapon-round. Controls and mechanical operation are the same as the weapon-round. However, indications of target acquisition are not provided. Each Stinger team is issued one field handling trainer.

TRAINING SET GUIDED MISSILE M134



The M134 training set consists of the tracking head trainer, five rechargeable NICAD batteries, an IFF simulator with cable, and a shipping and storage container.

This training set is used by the gunner to develop and maintain proficiency in tracking aircraft and firing the Stinger weapon.



TRACKING HEAD TRAINER

The trainer consists of the launch tube assembly (which contains the missile simulator), gripstock assembly, and a performance indicator. The trainer has the same general appearance as the weapon-round except for the performance indicator assembly. This assembly is strapped near the aft end of the launch tube. The trainer weighs about 38 pounds.



TRAINER BATTERY





TRAINER BATTERY BCU

The external appearance of the trainer battery is simular to the BCU except that the trainer battery is approximately 3 inches longer and about twice as heavy. At least 15 training missions of 47 seconds each are possible with a fully charged battery.



IFF SIMULATOR

The IFF simulator provides random, simulated IFF interrogation responses to the audio device in the trainer as on the weapon.

Further description of the training set and ancillary equipment is found in TM 9-6920-429-12. Use of the tracking head trainer for gunner evaluation is found, where appropriate, in chapters 15 and 16 of this manual.

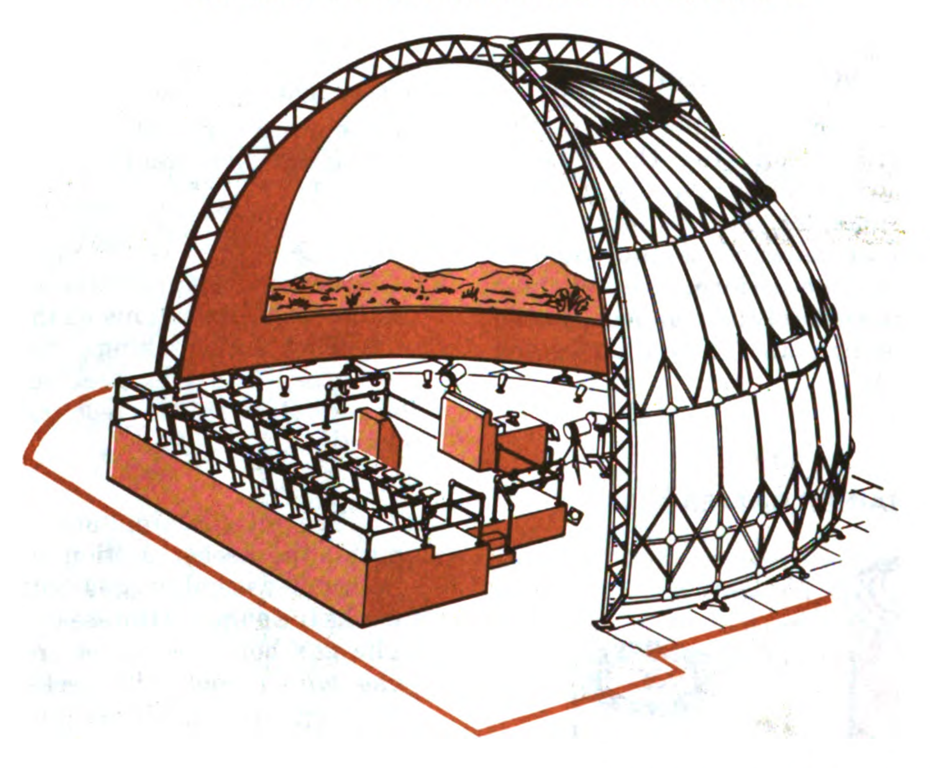
Electrical components provide the same audiovisual indications as the weapon when acquiring and tracking a target. Electrical power is provided by a rechargeable NICAD battery. Batteries are recharged on a battery charger.

The missile simulator has two major parts: the seeker section and the coolant reservoir assembly (gas bottle). The seeker works the same as the seeker on the weapon. The gas bottle contains pressurized argon gas which cools the seeker during each training mission. Under normal conditions, eighty 47-second practice engagements can be completed when the gas bottle has been fully pressurized.

The performance indicator displays the gunner's progress in a simulated engagement. It provides indications that the gunner has:

- Correctly performed the engagement sequence.
- Committed a correctable error - a procedural error that can be corrected prior to squeezing the firing trigger.
- Committed an uncorrectable error - squeezing the firing trigger out of sequence.
- Allowed the 47-second timer to run down which shuts down the trainer.

MOVING TARGET SIMULATOR (MTS) M87A1



The MTS M87A1 provides representative sights and sounds of aircraft expected to be encountered by Stinger gunners. Environmental realism is achieved through the use of a large display area, aircraft presentation, and sound. Aircraft images are projected on a curved display screen. The stereophonic sound is provided by recorded sound strips on the aircraft motion picture film. Another projector superimposes an IR spot on the aircraft image to complete the simulation of the tactical environment.

There are two training stations. Each one is capable of accommodating an instructor and a gunner with a Stinger tracking head trainer. To the rear of the training station is an observation area from which other gunners can observe the engagement sequence.

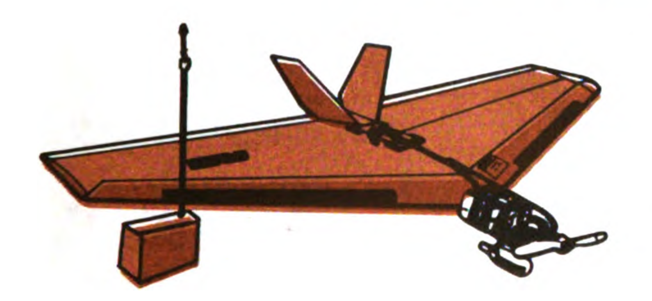
Moving target simulators are located at major installations in CONUS and overseas. A complete description of the MTS is found in TM 9-6920-427-10.

LAUNCH SIMULATORS

Stinger simulator devices under development are the Stinger Launch Simulator (STLS) and the Tracking Head Trainer Launch Simulator (THT/LS). The STLS launches a dummy projectile and simulates an actual missile launch. This device allows every gunner an opportunity to fire a weapon (launch a dummy missile). The THT/LS produces a simulated backblast effect when fired. Because of this, Stinger gunners using the THT/LS are more visible during field training exercises. This not only allows them to be more effectively evaluated but also allows them to enjoy a greater sense of participation in the exercise.

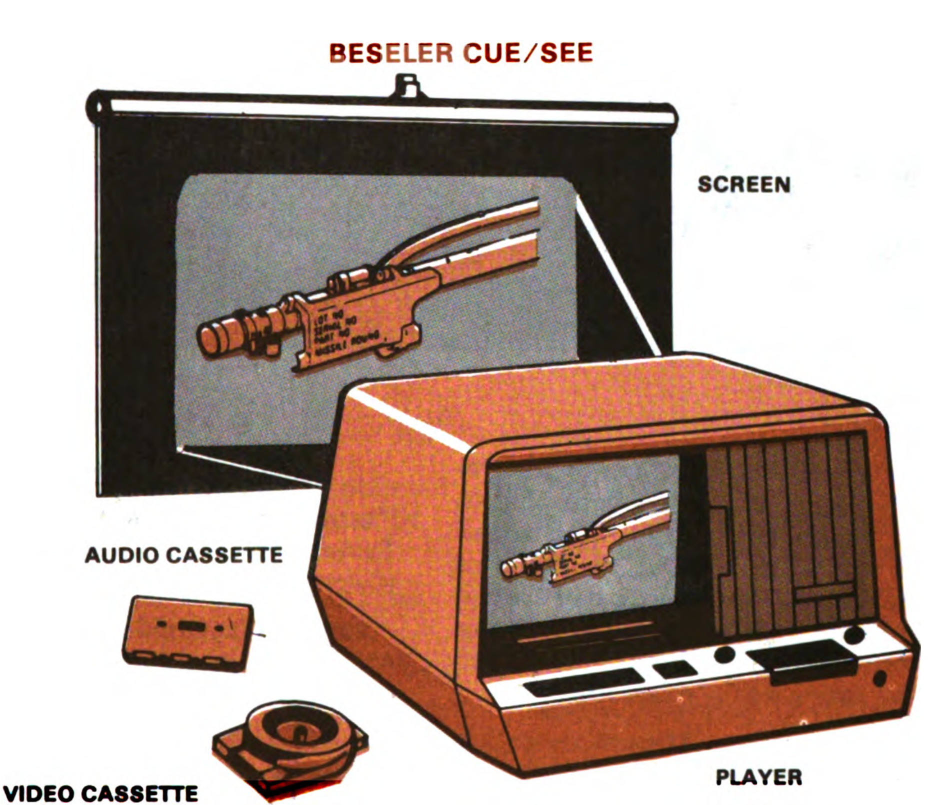


GUIDED MISSILE TARGET, MINIATURE FQM-117A



The FQM-117A is a durable target capable of providing an accurate simulation of an attacking aircraft. An IR source device can be attached to the target. This device provides the gunner practice in tracking and ranging. FQM-117As are available through the local training and audiovisual support center (TASC).

BESELER CUE/SEE

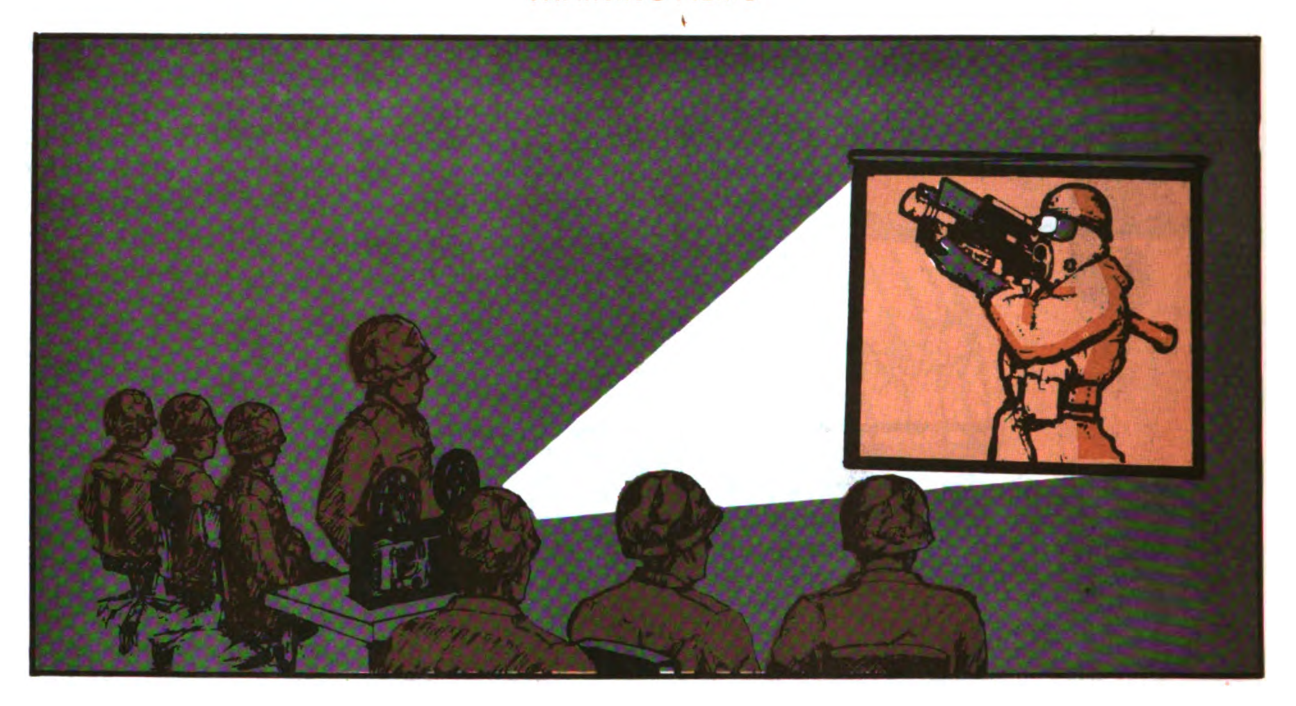


The Beseler Cue/See is used with training extension course (TEC) lessons. It can be used for training in all aspects of Stinger gunner procedures. The lessons are presented via a super 8-mm continuous loop cartridge projected on a 6- by 8-inch screen. The Beseler's light weight and small size allow it to be used almost anywhere. Eight Beseler Cue/Sees are issued to a combat arms battalion/ squadron.

This device is best used with one or two soldiers at a time. However, the lesson may be shown to a large group, if necessary. After completing each TEC lesson, the soldier completes a written test. If he answers all training objectives correctly, he goes on to the next lesson.

The local TASC has a catalog of all TEC lessons produced by Army service schools. TEC lessons covering Stinger gunner subjects are listed in appendix B.

TRAINING FILMS



US Army training films can be used to support instruction of Stinger personnel in both Army-wide skills and in Stinger operations. DA Pam 108-1 is an index of Army motion pictures and related audiovisual aids. It lists available training films and other audiovisual materials. Films of particular interest to trainers are:

44-series relating to Stinger, aircraft recognition, and other related subjects.

21-series relating to the individual soldier.

8-series relating to first aid and field sanitation.

5-series relating to camouflage and field fortifications.

Films and projection equipment are obtained from training and audiovisual support centers.

Specific Stinger training films/ television tapes that are in production include:

FILMS

***Introduction to the Stinger Guided Missile System (U)**
(Color--20 Min).

***Stinger Weapon System - IFF Programing (U)**
(Color--15 Min).

***Stinger Gunner - Target Engagement Procedures (U)**
(Color--20 Min).

TELEVISION TAPES

Stinger - Assembly, Checks, and Transportation
(Color--20 Min).

Stinger Employment
(Color--20 Min).

Stinger Team - Quick Reaction Drills
(Color--20 Min).

* These films are classified CONFIDENTIAL.



PUBLICATIONS



The DA Pam 310-series of pamphlets support the training of Stinger personnel. Of particular importance are:

DA Pam 310-1, Index of Administrative Publications (Regulations, Circulars, Pamphlets, Posters, Joint Chiefs of Staff Publications, DOD and Miscellaneous Publications.)

DA Pam 310-3, Index of Doctrinal, Training, and Organizational Publications.

DA Pam 310-4, Index of Technical Manuals, Technical Bulletins, Supply Manuals, Supply Bulletins, and Lubrication Orders.

DA Pam 310-12, Index and Description of Army Training Devices.

Each of these pamphlets is cross-indexed by subject and is updated by the distribution of changes as required.



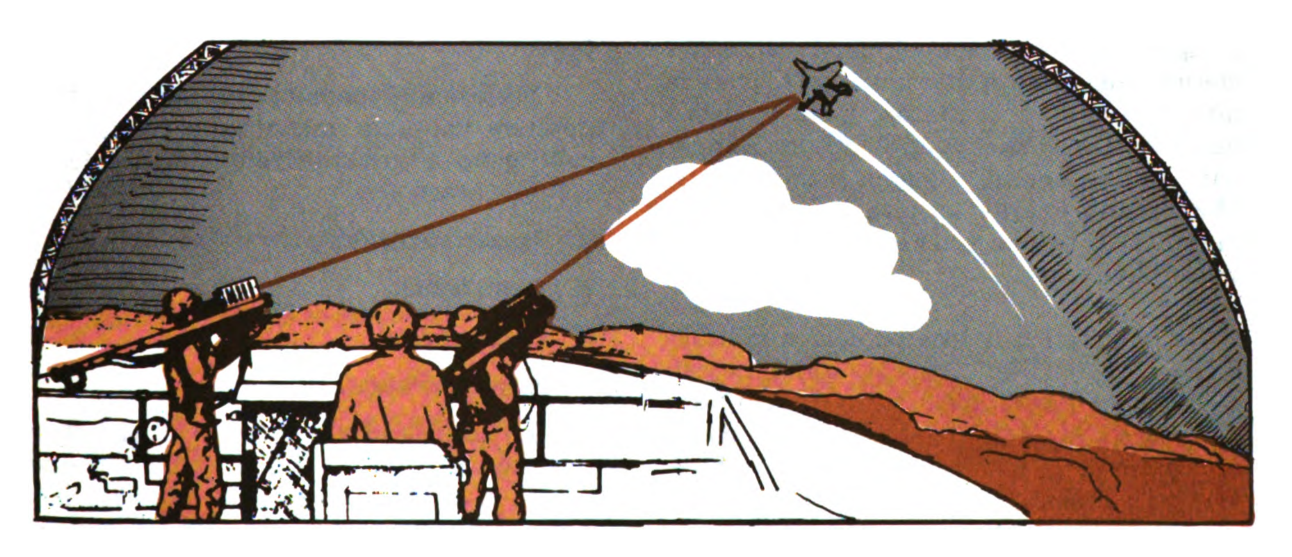
STINGER TRAINING CONCEPTS

To achieve a high state of proficiency, Stinger gunners must receive proper gunner training. If proficiency is to be maintained at an acceptable level, training must be standardized, increased, and scheduled at regular intervals.

CONTENTS

GUNNER TRAINING METHODS

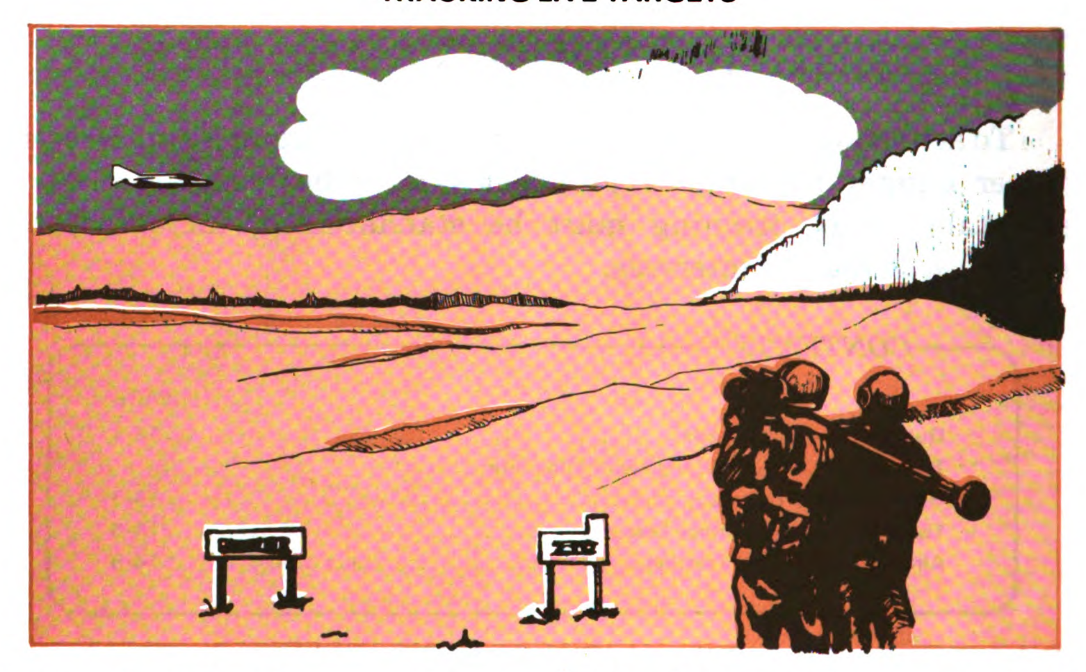
MOVING TARGET SIMULATOR (MTS) TRAINING



The MTS is the most effective single training device for training Stinger gunners. MTS training must be supplemented by live tracking exercises. This is because of background IR discrimination training requirements. The units which have MTS

facilities nearby and use them, show a higher proficiency level which is proportional to the amount of time spent tracking targets. It is critical that where MTS facilities are available gunners receive regular scheduled training in Stinger weapon handling and tracking. Conduct of training using the MTS is discussed in chapter 15.

TRACKING LIVE TARGETS



Some units having Stinger sections do not have access to an MTS. In this case, Stinger trainer personnel must use other methods of training their gunners to engage targets. Use of a miniature guided missile target can meet the requirement for Stinger gunners to simulate engagement of targets. The miniature target is suitable for use with the tracking head trainer to train gunners to track a live target.

If the section is located near a military airbase or civilian airport, gunners can receive meaningful training in tracking live aircraft. Money restraints restrict opportunities for Stinger sections to have tactical military aircraft for training purposes. The Stinger training manager or trainer can overcome this problem by using some innovations. For example, the trainer may ask the other services to have Stinger gunners practice engagement of their tactical aircraft. This could entail busing Stinger personnel to an Army airfield or Air Force base.

Section and team leaders can offer their gunners valuable, meaningful training by setting up a tracking range. Examples of suitable areas are:

- **Abandoned airstrips.**
- **Open fields.**
- **Parade fields.**
- **Maneuver areas.**

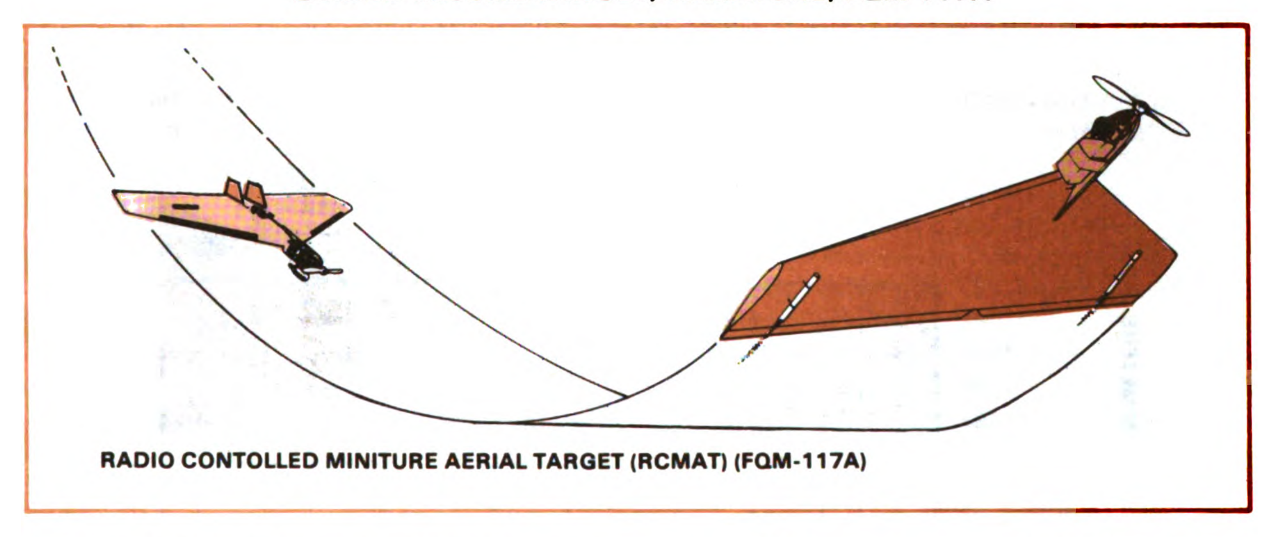
Tracking and simulated engagements of live aircraft with the tracking head trainer (THT) give Stinger gunners more realism. The realistic aspects of engaging real aircraft during bombing and strafing runs are not found in the other training methods. This is where the gunner receives background IR discrimination training.

TRAINING on a TRACKING RANGE with MINIATURE GUIDED MISSILE TARGETS

To maintain proficiency, Stinger gunners must track and practice engagement of aerial targets frequently. However, because of the high cost of using real aircraft, it is difficult to obtain sufficient tracking practice. To overcome this training limitation, more gunner training must be done at the home station using innovative training techniques and devices to simulate real aircraft. This training requirement has been met with the development and use of model aircraft as flying targets in unit training areas.

The radio controlled miniature guided missile target is a durable target capable of providing simulation of an attacking aircraft. It provides a target for detection, acquisition, tracking, and simulated firing with the Stinger weapon.

GUIDED MISSILE TARGET, MINIATURE, FQM-117A



RADIO CONTOLLED MINITURE AERIAL TARGET (RCMAT) (FQM-117A)

Engine: Gas powered, propeller driven.

Size: 1/6th scale (to a full size Threat aircraft).

Control: Ground-based, radio-controlled equipment.

Airspeed: From 25 to 80 knots.

Launching requirements: Hand launched.

Visibility: Satisfactory to about 800 meters.

Maneuverability: Representative of full scale aircraft.

IR flare burn time: About 15-20 minutes.

As a practical matter, the target's usage is limited by the imagination of the unit commanders, the target operator's skill, and the restraints of range safety. The target can be flown in any weather. The visual reference required for flying is normally the limiting factor. Surface winds 25 knots or below do not restrict the system's usage.

A second characteristic is the "combative" nature of the miniature missile target. The maneuver capabilities of the target match those of any full-size, fixed-wing aircraft and the use of these maneuvers is under the direction of the instructor. Thus the target can challenge the gunner by flying in a realistic manner, taking full advantage of terrain features, evasive maneuvers and scale speed.

This unrestricted presentation capability introduces a competition between target and gunner that holds the attention of the personnel in the training area. Improved morale based on this competition is a most important element in the FQM-117A's success to date.

Another characteristic of the system is the low level of logistic support required.

FQM-117As are available through training and audiovisual support centers. They are normally issued in kit form.

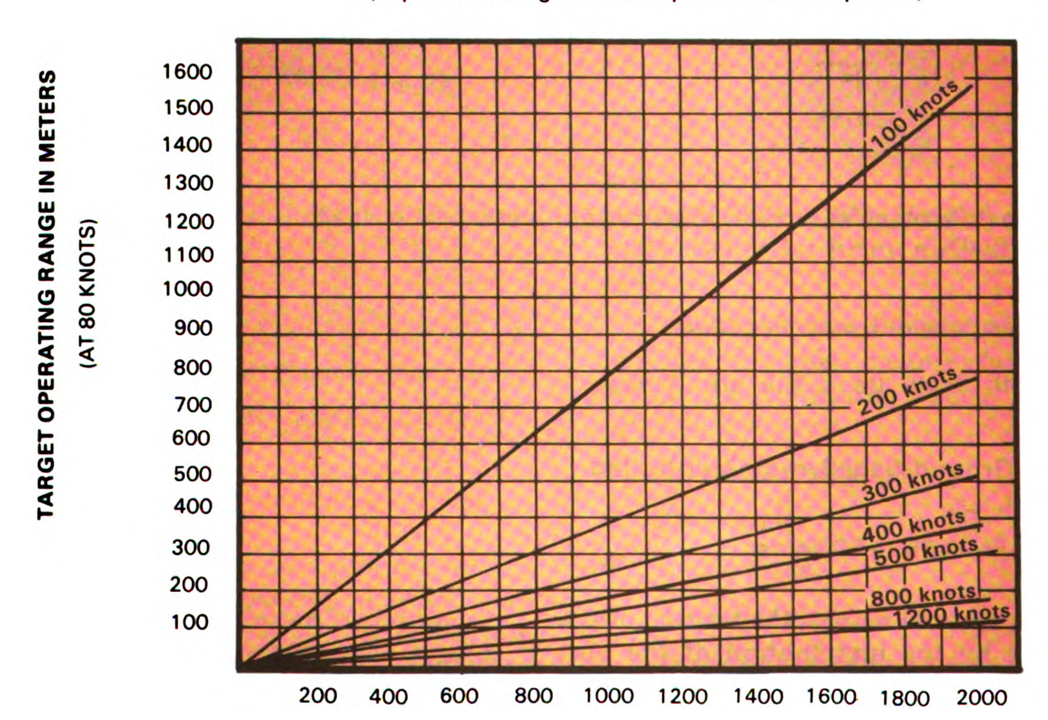
Kit, Airframe, FQM-117A, contains an engine, 3 airframes, 10 propellers, 4 glowplugs, and assembly materials.

Kit, Transmitter, contains three transmitters on 25.450 MHz, and three transmitters on 25.534 MHz.

Kit, Ground Support Equipment, consists of station case, operator's manual, parts box, three flight boxes, two tool sets, and electrical test equipment.

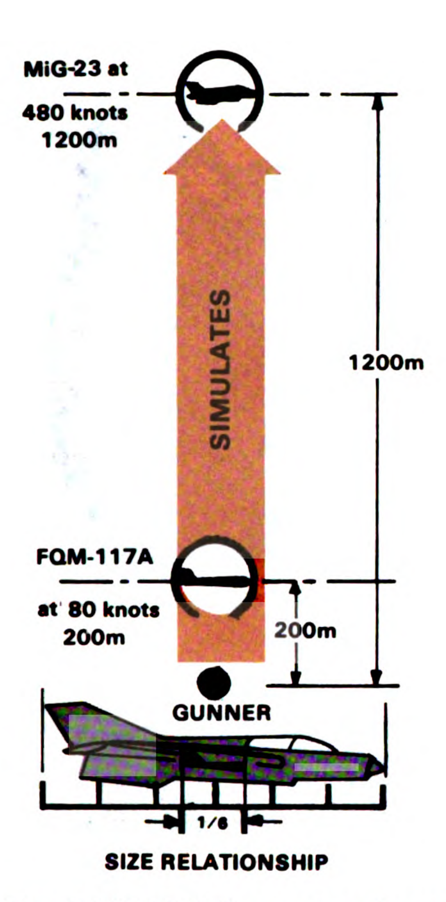
Assembly and operation of the FQM-117A is the responsibility of the using unit, normally the battalion. One trained operator and a helper are required.

This graph gives an idea of representative distances from the Stinger position to the target (real aircraft versus miniature target).



Step 1. Locate desired simulated target range along bottom line of chart.
Step 2. Move up chart along this line until desired target speed intersects with this line.

Step 3. Then left to find operating range for the FQM-117A.



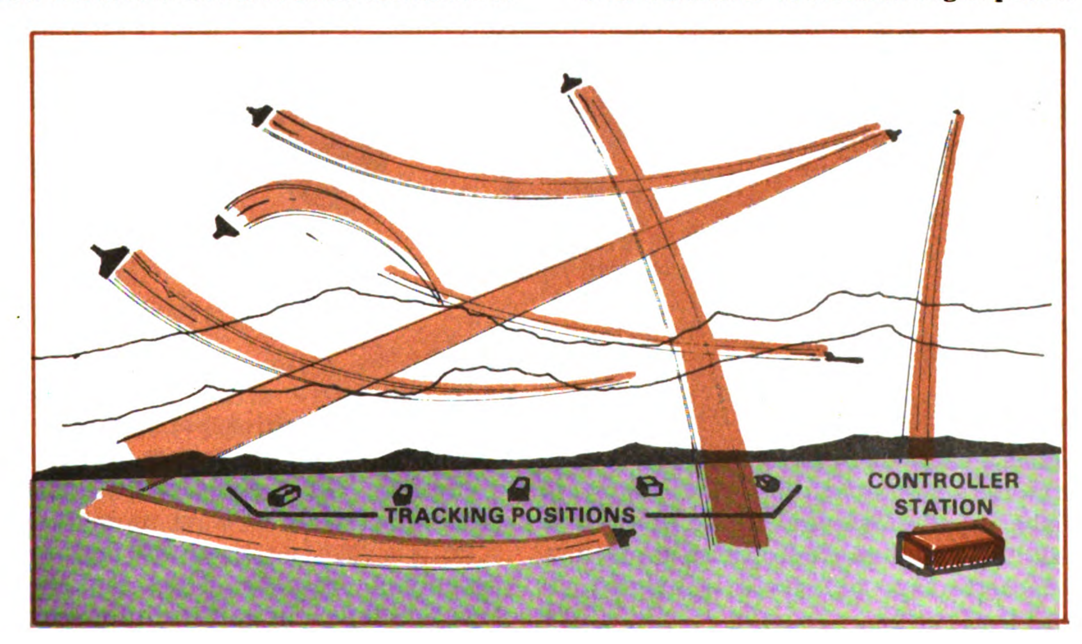
SIZE RELATIONSHIP

The FQM-117A has approximately 1/6 the speed and visual size of a full size threat aircraft. When it is flown at scale distances it simulates the performance envelope of the target aircraft to give the trainer a realistic adversary for his tracking training.

Using a tracking range or tracking area, units can realistically simulate Stinger engagement of real aircraft. When using the target, remember to adjust the distance for the scaled down version of a real aircraft. To give relative figures, the diagram on page 14-4 shows the relationship between the model and an actual aircraft when tracking a crossing target. The speed, and the distance from the gunner are approximate figures.

USING the MINIATURE TARGET

The instructor coordinates closely with the target controller prior to an exercise. For example, he may want the target to execute popup attacks to exercise the gunner's skill in coping with this type of maneuver. Target maneuvers can range from easy to track to impossible to track. The instructor should have some flights pass over or close to the Stinger position. This provides the gunner with realistic situations when engaging high-speed aircraft at close range. A sample non-firing tracking area layout is shown below with a number of selected flight paths.

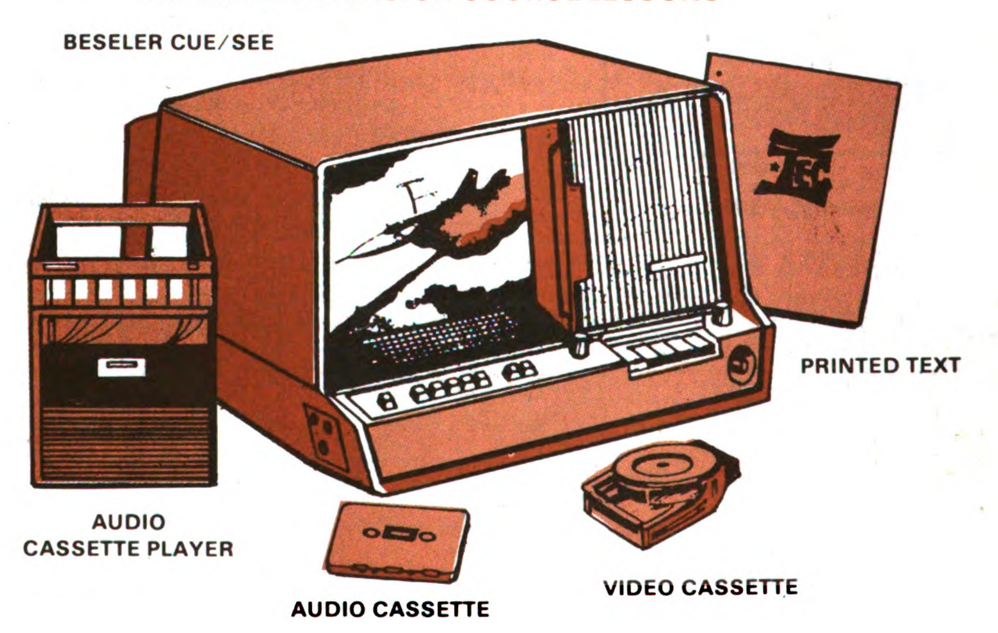


PROTECTIVE MASK TRAINING

Stinger team members must be allowed to don a protective mask, such as the M17A1, while training in the MTS and when tracking live aircraft and targets. Training with the protective mask accustoms the team members to handling the weapon in an NBC environment. Some difficulty may be experienced in feeling the vibrations generated by the IR acquisition indicators with the mask on. However, the IR tone can be heard. The team member may have to adjust his head position slightly in order to obtain a clearer sight picture. Tracking with the mask on will reinforce the team member's confidence in firing the weapon in an NBC environment.



TRAINING EXTENSION COURSE LESSONS



WHAT TEC IS

The Training Extension Course (TEC) system is designed to assist soldiers and unit commanders in increasing job proficiency. It consists of audiovisual, audio-only, and printed text lessons. Audiovisual projectors and cassette tape players are included to present the lessons.

TEC provides performance oriented training in many subjects needed by Stinger gunners. These subjects include skills that are common to all soldiers as well as those skills needed to operate and maintain Stinger weapon systems. This makes TEC an essential part of unit training programs.

Use of TEC lessons provides flexibility in the unit training program. It allows commanders to stress skills required by individual soldiers. TEC lessons can be presented:

- **In unit learning centers, classrooms, or in the field.**
- **To individuals or small groups.**
- **As self-paced instruction.**
- **To correct a specific shortcoming.**

Most MOS TEC lessons available for Stinger are audiovisual; several are audio only. Appendix B contains a current listing. Lessons available in the field cover:

- **Weapon operation.**
- **Stinger team deployment and tactics.**
- **Quick-reaction exercises.**
- **Maintenance.**
- **IFF programming.**

Common subject and MOS TEC lessons are automatically distributed to units when completed or revised. In addition, each audiovisual support center receives copies of the lessons. These are used to replace, by direct exchange, lessons found to be damaged or defective.

HOW TEC is USED

Each lesson contains lesson administrative instructions (LAI) which provide guidance on how to use the TEC training method to identify and solve training deficiencies. To identify training deficiencies, the trainer is provided with pretests and post tests in the LAI. The soldier's proficiency can be determined by having him take the pretest. For example, if the soldier passes the test, he does not need the training. On the other hand, if he does not pass it, the lesson is prescribed for training. The post test is used to determine whether the soldier did learn the lesson; if not, he can repeat the lesson.

TEC lessons are developed to allow the soldier to work on his own time and at his own speed.

Material telling how to effectively use TEC lessons is obtained from:

TEC lesson 920-061-0500-F, Introduction to TEC.

TEC lesson 920-777-0505-A, TEC for Green Tabbers. Also, TC 21-5-3, TEC Management Instruction, contains guidance on how to use the TEC system and develop the unit's support structure for TEC.

Stinger related TEC lessons are listed in appendix D.

USING the BESELER CUE/SEE

The Beseler Cue/See can be used for training in all aspects of Stinger training. The lesson is presented via a super 8-mm continuous loop video cassette that is synchronized with an audio tape cassette. The lesson is normally presented on a 6x8-inch screen on the front of the Beseler Cue/See. However, by opening a small door at the rear of the device, the picture can be projected onto a normal screen or classroom wall for larger groups. The film speed can be adjusted from a single frame to 24 frames per second. Frames may be stopped automatically to allow some action by the student such as reading a procedure from a technical manual or answering a question. The Beseler's light weight and small size allow it to be used almost anywhere.

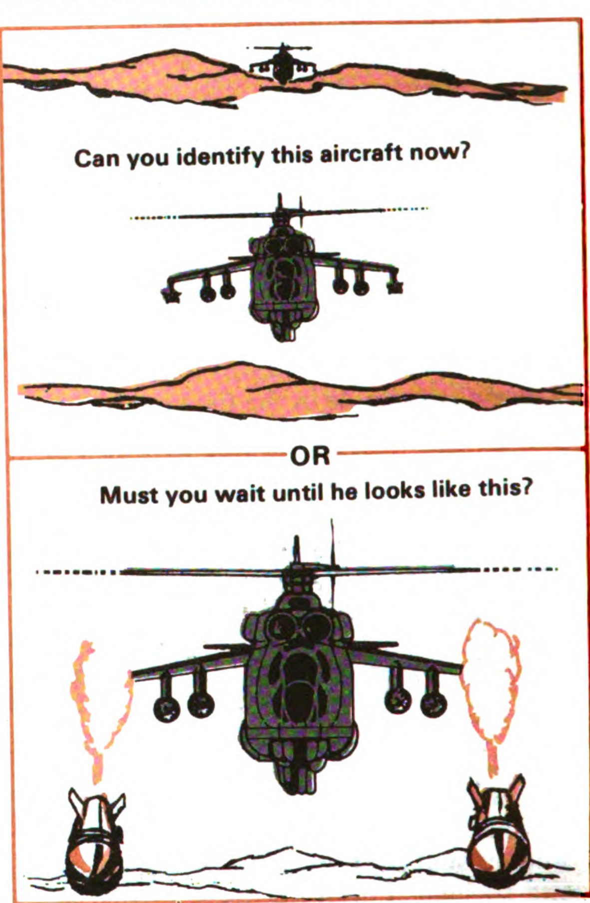
AIRCRAFT RECOGNITION TRAINING

Aircraft recognition for tactical purposes has become a complex and ever changing problem. New aircraft and changing aircraft designs have become a continuous factor. Also, some not-so-friendly countries have bought aircraft from friendly countries which may cause these aircraft to become threat aircraft. This ever changing situation poses a real challenge for those who teach visual aircraft recognition. Perhaps the biggest problem in recognition has been teaching it in an effective and realistic fashion.

Troops must be trained to be proficient in quick aircraft recognition. Hostile low flying aircraft may appear suddenly from behind low hills, belts of trees, or haze. High-speed aircraft are difficult to identify. Accurate visual recognition of aircraft is essential to Stinger personnel in making their engagement decision. It is vital that recognition be ***swift*** and ***accurate.*** Team members should be experts at recognizing all friendly and potentially hostile aircraft expected to be operating at low altitudes in a specified combat zone. Each team member should approach 100 percent recognition accuracy with 90 percent being a minimum acceptable level of proficiency.

Practicality dictates that aircraft recognition training be conducted using picture images of the aircraft to be learned. Two basic methods for presenting images to trainees are by use of the Ground Observer Aircraft Recognition (GOAR) Kit and the Training Extension Course (TEC) lessons designed for aircraft recognition training. In addition, graphic training aids (GTAs) such as printed cards and charts, are useful supplements to GOAR and TEC. Numbers and titles of GTAs currently available, or under production, include:

- 44-2-1 Visual Aircraft Recognition Study Cards
- 44-2-5 Soviet and Warsaw Pact Forward Area Aircraft
- 44-2-6 Aircraft Recognition Playing Cards
- 44-2-7 Military Aircraft Markings You Should Know
- 44-2-8 Free World Forward Area Aircraft
- 44-2-9 USSR Aircraft Compared to US Aircraft



Aircraft recognition training is covered in detail in TC 44-30. Aircraft Recognition Training for Ground Observers. This training circular should be used as a guide for planning and conducting aircraft recognition training in Stinger units. The training circular tells instructors how to use the TEC and GOAR methods of instruction as well as the GTAs used with recognition training. It also provides information on how to plan and prepare a training program in this subject. Furthermore, it can be used by those persons who establish training requirements and who evaluate job proficiency of individuals and the combat readiness of Stinger units.



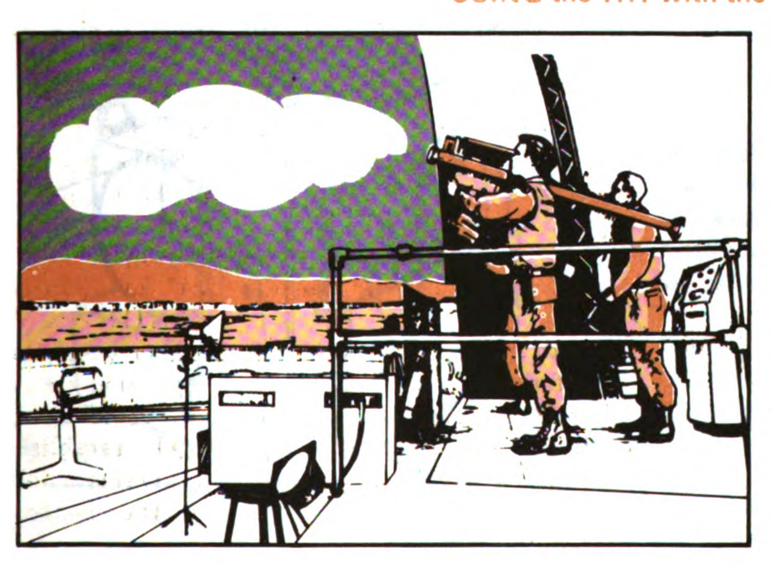
CHAPTER

MOVING TARGET SIMULATOR TRAINING

The Stinger/Redeye Moving Target Simulator (MTS) M87A1, and the Tracking Head Trainer (THT) are used to simulate tactical air defense engagement. The objective of the MTS training is to provide a means of training and evaluating the performance of a Stinger gunner under simulated combat conditions. The THT trainer provides the means for gunners to practice Stinger engagement procedures including weapon operation, engagement decisions, and firing. Since this is accomplished without the use of actual aircraft or live Stinger rounds, much of the expense involved with live tracking and firing is eliminated.

CONTENTS

USING the THT with the MTS



The THT simulates the operating characteristics of the weapon system from activation to firing. A performance indicator assembly is provided on the device to indicate the status and sequence of operation conducted by the trainee. The firing sequence must be completed within 47 seconds following activation, which approximates the life of the battery coolant unit (BCU). Thus, the gunner must operate the THT under the same time constraints of the weapon system.

Electrical power for the THT is provided through a flexible power cord at the MTS, or a rechargeable battery may be used when the device is used in the field for tracking live aircraft.

The power supply or battery must be partially removed and reinserted between engagements to simulate removal of the expended BCU in a tactical system.

Following activation of the THT, the performance indicator will indicate when acquisition of IR is achieved. The gunner will also receive an audible tone when acquisition is achieved as with the tactical system. Following acquisition and while continuing to track, the gunner must uncage the gyro to permit the THT to automatically track the IR source. The indicator panel indicates when automatic track is attained and the gunner also receives a shift in tone level through the acquisition indicator. The time to proceed with the firing sequence is based on the range ring measurement which determines when the target is within the engagement zone or the effective range of the Stinger weapon system.

The MTS film reels provide information to the instructor which indicates when the respective target is within acquisition range, and at the hold fire, resume fire, or cease fire points of the flight path. These points correspond to range and flight path for each of the two aircraft classes (jet and prop) taught with the technique of fire.

Following determination to fire, the gunner must superelevate and select the proper lower sight reticle (left, center, or right) and maintain track of the target. At the time the firing trigger is pulled, an audible beep will indicate successful completion of the engagement. In addition the panel will indicate all steps were conducted properly. The gunner may reacquire the target and repeat the engagement sequence within the 47-second time period from initial activation.

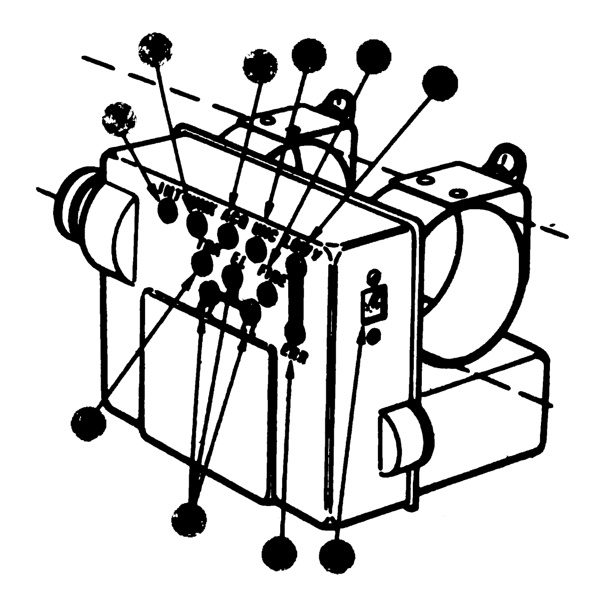
VISUAL and AUDIBLE INDICATORS

Visual Indicators

The THT simulates all the functions of the Stinger weapon except the missile launch. In addition, the trainer provides an indication of the correct or incorrect performance of each major event in the engagement sequence.

Attached to the aft end of the launch tube is a display box (performance indicator assembly) with 10 visual indicators.

Each step of the operating procedure is recorded by a white flag in the appropriate indicator window.



The visual indicators function as follows:

	VISUAL PERFORMANCE INDICATORS		
	ACTION	INDICATOR CHANGE	INDICATION
1 INT	Press IFF interrogate switch.	● ➡ ○	IFF switch is pressed.
2 UNK	IFF response received.	● ➡ ○	Aircraft is unknown.
3 ACQ	IR is received by seeker.	● ➡ ○	Gunner is tracking target, keeping it in field-of-view of seeker.
4 TRK	Acquire target and press uncaging switch.	● ➡ ○	Seeker is locked on and tracking target.
5 UNC	Press uncaging switch.	● ➡ ○	Gyro uncaged. Missile seeker freed to lock on and track target automatically.
	Release uncaging switch.	○ ➡ ●	Uncaging switch released.
6 LL, RL EL	**Apply left or right lead and superelevation.**	● ➡ ○	Lead and superelevation have been applied.
7 FIRE	Press firing trigger.	● ➡ ○	Firing trigger is pressed.
8 ERR	Gunner made an error.	● ➡ ○ Error Tone Sounds	■ Pressed firing trigger without: • Acquisition during tracking. • Uncaging. • Superelevation. ■ Fired on a friendly target after IFF interrogation. ■ Hold firing trigger less than ½ second or released uncaging switch.
9 LOW V	None.	● ➡ ○	Voltage too low to operate THT.
10 EVENTS COUNTER	Counts number of times gyro spins.	3	Number of times safety actuator device is operated.

AUDIBLE INDICATORS

The trainer presents audible indications that certain actions in the engagement sequence have, or have not, taken place. The audible indicators include:

Gyro spinup tone — After the gunner activates the trainer, its seeker gyro starts to spin. The sound it makes can be heard as a low buzz from the acquisition indicators. The sound increases in pitch until full gyro speed is reached.

IR acquisition tone — When IR radiations are received by the missile seeker, a tone is generated and can be heard coming from the acquisition indicators. The tone may vary in pitch and amplitude but indicates that the gunner is tracking the target within the field of view of the seeker. When the gunner uncages the seeker and the seeker locks on the target's IR radiations, the tone becomes louder and steadier. This indicates seeker acquisition.

Single pulse tone — This tone is heard as a short "beep" (half-second tone). It indicates a successful launch (simulates that the missile has cleared the launch tube).

Error tone — If an error occurs, a rising-and-falling (warbling) tone, which is higher pitched than the acquisition tone, is heard. The warbling tone continues until the gunner removes the battery or until power shutdown. An error tone will be heard under the same conditions as explained in visual indicator (8), previously explained.

ERROR INDICATIONS

During the operating sequence, all mistakes can be corrected as long as the firing trigger is not pressed. However, if the firing trigger is pressed, the mistake becomes uncorrectable, as noted by the warbling tone. Uncorrectable errors include the same conditions as explained under visual indicator (8), previously explained. An example of a correctable error is the loss of IR tone when the uncaging switch is pressed. This can occur because the gunner is not tracking smoothly. The gunner can correct this by recaging the gyro and reacquiring the target.

TRAINER TIMER

The THT has a 47-second timer which simulates the operating life of the battery coolant unit (BCU). The timer begins running down when the trainer is activated and will shut the trainer down at the end of 47 seconds. If the engagement has not been completed by the time the trainer shuts down, the gunner simulates the removal of a dead BCU and the insertion of a new one.

MTS TARGET REELS

The MTS projects the images of an aircraft against a natural sky background with aircraft sound effects. Twelve reels of film are used with 20 or 25 target presentations per reel. Reels 1 through 10 contain progressively more difficult target presentations. Initial films show slow aircraft moving on straight and level courses. As the trainee becomes more proficient at engaging the aircraft, the target runs courses and maneuvers which tax the gunner's ability to engage the target. Aircraft include friendlies as well as unknowns and must be identified as such. Reels 11 and 12 contain aircraft of all performance categories, and are representative of the variety of targets to be engaged by the tactical Stinger weapon system. A 13th reel to be used for SQT purposes, will be released at a later date.



The purpose of each reel is:

Reel No. 1 — To familiarize the trainee with the training equipment, method of target presentation, and procedures to be followed during the training period. The first reel also trains the trainee in determining the proper time to activate, launch, hold fire, and cease fire. Targets fly slow on crossing courses. All aircraft are hostile.

Reel No. 2 — To train the gunner in engagement procedures against targets flying straight and level courses. Speeds do not exceed 200 knots. All aircraft are hostile.

Reel No. 3 — To train the gunner in engagement procedures against maneuvering targets. Some crossing targets are less than 1.0 km from the gunners. These close-in targets familiarize the gunner with hold fire procedures for low-speed targets. All aircraft are hostile.

Reel No. 4 — To train the gunner in engagement procedures against maneuvering jet aircraft flying at low speed. One exception is run No. 11 which is a nonjet aircraft. Target speeds are less than 300 knots and include target turns of less than 90°.

This reel allows the gunner to become familiar with techniques of fire against jet aircraft. The low speeds provide the gunner time to complete the engagement at this early stage of training. All aircraft are hostile.

Reel No. 5 — To train the gunner in engagement procedures against maneuvering high- and low-speed targets. All previously used techniques of fire are used by the gunner in accordance with aircraft class. There are 25 aircraft runs in this reel.

Reel No. 6 — To exercise the gunner on target engagement against maneuvering targets of all classes. Target speeds range from 100 to 450 knots and altitudes from 500 to 6500 feet. There are 25 aircraft runs in this reel.

Reel No. 7 — To exercise the gunner on target engagement against maneuvering targets of mixed classes. Target speeds vary from 300 to 800 knots and altitudes from 0 to 6500 feet. Popup attack runs and target maneuvers increasing in difficulty are featured in this reel.

Reel No. 8 — To train the gunner on engagement procedures against maneuvering targets with speeds up to 800 knots. Targets are generally at higher altitudes and a few are at ranges near the outer launch boundary. Gunners are trained to rapidly perform the firing sequence including IFF procedures and determine when to launch and cease fire. The gunner is exercised against a wide variety of attacking aircraft using ordnance delivery techniques.

Reel No. 9 — To exercise the gunner against high- and low-altitude, high-speed maneuvering targets. Runs include aircraft paths which present relatively high elevation angles at crossover. The gunner is exercised on his ability to rapidly perform the firing sequence including emphasis on correct lead angle and determining when to launch and cease fire.

Reel No. 10 — To acquaint the gunner with and provide for practice in the engagement procedures of aircraft performing low-altitude tactical ordnance delivery. Aircraft generally start the run at long range, perform a climb or entry maneuver, and roll over at a high altitude prior to the delivery dive. After releasing its ordnance, the aircraft performs a high-speed escape maneuver. Target speeds range from 400 to 800 knots.

Reels No. 11 and 12 — Targets presented include a selected mix of target runs from reels 1 through 10.

Reel No. 13 — To examine the gunner on previously learned knowledge and skills. This reel will be released at a later date.

MTS OPERATION and INSTRUCTOR AIDS

A trained instructor operates the MTS console and coordinates the film program (reels) with the required training. The instructor should be well versed in all aspects of the MTS M87A1 and THT operation. The instructor should know how to operate the MTS console. Also, he should know how to use the MTS instructor aids to effectively train the Stinger trainees/gunners. However, he is not responsible for the loading of film into the target image projector or operation of the projector. Coordination with the MTS civilian technician is required in advance to allow for scheduling and preparation of equipment. The instructor contacts the MTS technician when he needs assistance or if a malfunction occurs.

INSTRUCTOR AIDS

Within the MTS, the instructor is provided with target data. He is alerted through an audio earpiece to upcoming target information. This information comes through an induction loop which is under the instructor platform. This data is obtained from recorded sound on the 16-mm film between target runs. The information received is a voice telling the approach direction and type of aircraft (friendly/hostile and its flight path). The instructor uses this information as an aid in evaluating the gunner's performance.

The instructor also receives four tones through the earpiece:

The ***first*** tone indicates the IR source is on.

The ***second*** tone indicates the target is within range.

The ***third*** tone indicates the target is out of range.

The ***fourth*** tone indicates the IR source is off.

IFF SIMULATOR

The IFF simulator response for the THT is controlled by an instructor operated switch on the MTS instructor's console. The instructor places the IFF mode switch in the position corresponding with the type of aircraft, e.g., hostile — IFF switch to unknown. IFF response may be either a true or selected response. Six IFF response options are provided.

- Bad self-test.
- Mode 3 friend.
- Mode 4 friend.
- Unknown.
- Mode 3 friend or unknown as determined by the film.
- Mode 4 friend or unknown as determined by the film.

IFF INDUCTION LOOP

To check out the IFF induction loop transmitter, use the following procedures:

1 Set IFF selector switch to the bad self-test position and depress IFF interrogation switch. (No tone response will be generated by the weapon.)

2 Pause 5 seconds.

3 Set the IFF selector switch to mode 3 friend/foe position and depress the interrogation switch (a coded foe will produce a series of short tone bursts).

4 Pause 5 seconds.

5 With the IFF selector switch remaining at its current position, depress the IFF interrogation switch. Chapter 4 indicates the replies required to determine a coded friend. If any responses are incorrect, call the MTS civilian technician for assistance.



MTS INSTRUCTOR PUBLICATION

A technical publication is provided for the instructor so that he has ready information for each target presented. The publication shows each aircraft flight path used with the MTS. Aircraft flight paths (target runs) are arranged by reels and show pertinent information for instructor use. The target runs show aircraft motion with respect to the gunner's position. IR and launch boundaries are shown on each target run. The target runs for each reel are preceded by a summary sheet.

Reel Summary Sheet. **There are 12 reel summary sheets for instructor use. The reel summary sheet is found at the beginning of each set of target run sheets. Included within each reel summary sheet are the reel number and run number which identify each target presentation. Coded "type" of aircraft is referenced to aircraft type whose NATO designation is shown on the target run sheet. Entry of aircraft on screen is stated using azimuth, ground range, and altitude. Azimuth is stated in degrees. Ground range in kilometers is measured from the gunner position. Altitude is stated in feet. Aircraft course is stated in degrees. Speed is stated in knots, and time of run in seconds. Aircraft exit data is also stated using azimuth, ground range, altitude, and speed.**

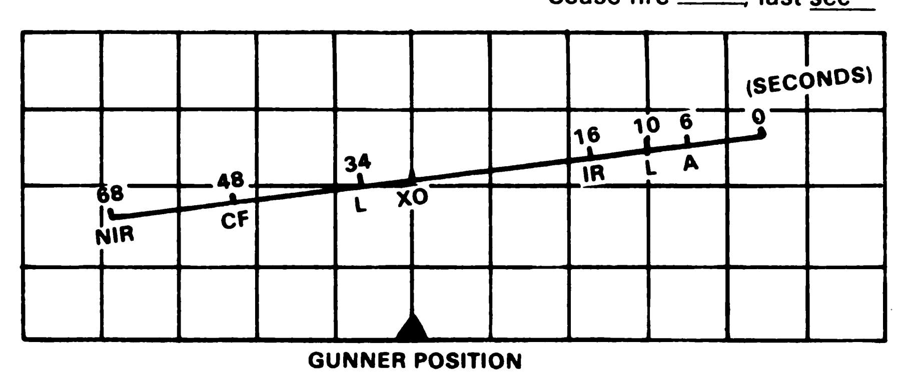
Target Run Sheet. Each reel has 20 or 25 target run sheets. The target run sheet is a graphic presentation of the course the target will fly across the MTS screen. The plot of the target course is annotated to show when critical elements of the engagement should occur. A sample run sheet follows.

SAMPLE

TARGET RUN SHEET

Flight time --- 40 seconds
Target type --- MONSOON
Target size:
Wing span - 28 meters
Fuselage - 42 meters
Target speed - 300 knots
Altitude ---- 1124 feet

IFF ---- FOE
Entry -- 85°; Angle - 2 o'clock
Crossover slant range -- 2000 meters
Type trajectory; Crossing R - L
IR on first ____ IR off last ____
Launch on sec; last sec
Cease fire ____; last sec



KEY

A—Target crosses ACTIVATE boundary.

L—Target crosses the LAUNCH boundary.

IR—Target IR acquisition possible past this point.

XO—Target is at CROSSOVER.

CF—Target crosses CEASE FIRE boundary.

NIR—No IR emission available after passing this point.

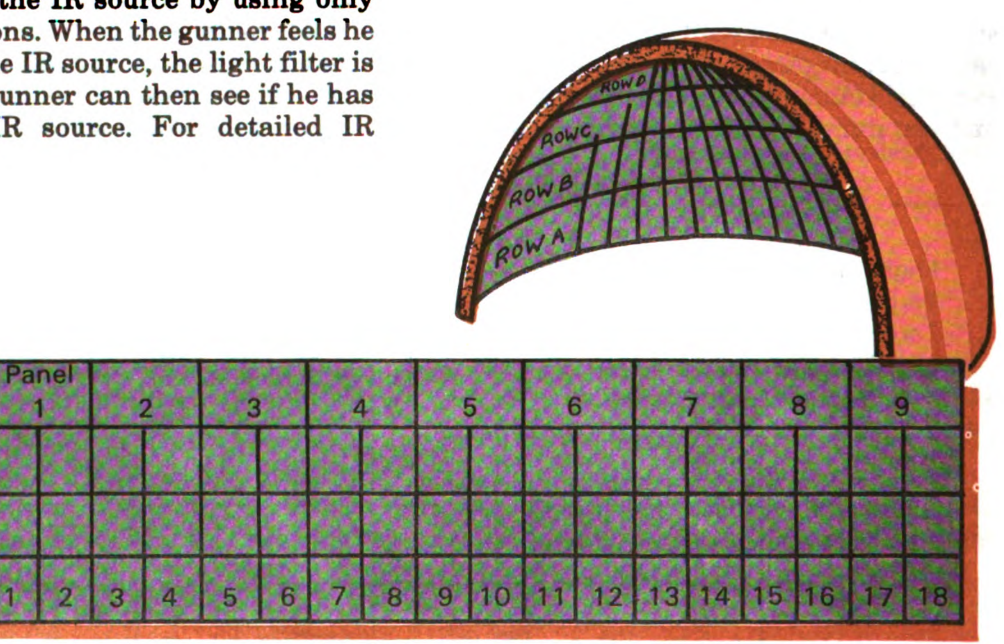
USE of a CLOUD PROJECTOR

Because background radiation can cause the weapon to lock on a cloud or other object reflecting sunlight the gunner must be trained to discriminate IR tones. The purpose of the IR cloud projector is to project a simulated IR radiation background on the screen. This allows the gunner to experience a target actually flying through background.

To accomplish this effect, the instructor puts the visible light filter on the IR projector (IR source). The source is then positioned in the simulated background. The gunner then, by sweeping and using the figure 8 method, has to acquire the IR source by using only audio acquisitions. When the gunner feels he has acquired the IR source, the light filter is removed. The gunner can then see if he has acquired the IR source. For detailed IR discrimination procedures, refer to MTS training block, 2d hour, page 15-12.

The IR discrimination techniques are taught during initial Stinger gunner training classes in the MTS. The cloud projector is left on for subsequent training to simulate an actual environment.

MTS Panel System



A panel placement system is used on the MTS background screen. The panel numbers are used for positioning the clouds during the various training activities. The instructor can easily determine where to spot the IR cloud projector by using the instructions below. There are a total of 63 panels. The rows are horizontal indicated by a letter. The panels within that row are indicated by a number; e.g., A5 is row A, panel 5; B9 is row B, panel 9. The center screen area is at intersection A9, A10, B9, and B10.

Recommended cloud positions on the MTS screen for the left and right cloud projectors, by reel, are shown in the following table.

CLOUD POSITIONS

Reel	Projector	Position
1	Left	The center of the cloud at the intersection of A4, A5, B4, and B5.
	Right	The center of the cloud at the intersection A14, A15, B14, and B15.
2	Left	Same as Reel 1.
	Right	Same as Reel 1.
3	Left	The top center of the cloud is centered at the top of A8.
	Right	The center of the cloud at the intersection A14, A15, B14, and B15.
4	Left	The cloud centered in the middle of B6.
	Right	The center of the cloud 1/3 up the seam of B14 and B15.
5	Left	The center of the cloud 2/3s up the seam between B7 and B8.
	Right	The center of the cloud 2/3s up the seam between B11 and B12.
6	Left	The bottom of the cloud centered on the top seam of A5 and A6.
	Right	The bottom of the cloud centered on the top seam of A14 and A15.
7	Left	The center of the cloud 1/3 up the center of B4.
	Right	The center of the cloud 1/2 up the center of B13.
8	Left	The center of the cloud 1/3 up the seam between B4 and B5.
	Right	The center of the cloud 2/3s up the seam between B12 and B13.
9	Left	The bottom of the cloud centered on the top seam of B5.
	Right	The center of the cloud 1/3 up the seam of B13 and B14.
10	Left	The center of the cloud 1/2 up the seam of B5 and B6.
	Right	The center of the cloud 1/3 up the seam of B14 and B15.
11	Left	The top of the cloud centered on the top seam of B5.
	Right	The top of the cloud centered on the top seam of A14.
12	Left	The top of the cloud centered on the top seam B4.
	Right	The bottom of the cloud centered on the top seam intersection of B14 and B15.

INSTRUCTOR PROCEDURES

Before class, the instructor makes sure that the projector is loaded with the required film, the system is energized and checked out, and that necessary training equipment is on hand. Training equipment should include a fully operational THT at each station, also, evaluation sheets for each student gunner (if required), instructor manual, and other materials which the instructor considers useful and appropriate.

The instructor briefly orients "first time" students on the main features of the MTS. The instructor demonstrates the effects which may be accomplished including lighting, sound, IR (visible and invisible), and typical target (first target run on screen). The MTS technician will assist in the IR demonstration by operating the IR filter.

The instructor explains the use of the power supply for the THT in the MTS. He then reviews engagement procedures including aircraft recognition and interrogation, aircraft classes, detection, activation, fire, hold fire, and cease fire.

State the objectives and standards of the reel to be used and briefly describe the targets to be expected including types, speeds, and maneuvers. Assign gunners to firing stations. Tell the gunner to inspect the THT for proper battery voltage and gas pressure (green), and shoulder the trainer.

Start the target run. The gunner must search and scan, detect, activate, and track the target. He must perform the correct weapon operational sequence to achieve a successful launch. The instructor(s) evaluates all gunner activities during engagement procedures. By listening to his audio cues, the instructor can determine if the gunner fires within IR and launch boundaries. If the THT shows a procedural error, the instructor should examine the performance indicator, determine the cause of the error, and correct the gunner at that time.

Following this introduction, the student gunners begin the series of training sessions with the 12 reels of target presentations. After the initial phase, the situation should be made as realistic as possible. Include both hostile and friendly aircraft commencing with the fifth reel.

The instructor should decide when the student has progressed to where he has a good working knowledge of the engagement cycle. The student can then start giving the trainee practice in engagement decisions under simulated weapons control statuses.

SAMPLE STINGER MTS TRAINING BLOCK

A sample MTS block of instruction shows the minimum requirement for training Stinger gunners. The 17-hour block of instruction is designed to give instructors a feel for the purpose and scope of the training. It is not written as a lesson plan. Individual lesson plan samples are found in FM 21-6, How to Prepare and Conduct Military Training. Training objectives are spelled out where required. Intermediate training objectives and other elements of a lesson plan should be developed where required.

EQUIPMENT REQUIRED

- Moving Target Simulator M87A1
- 2 Tracking Head Training sets
- Ear plugs
- 2 Stop watches
- 2 Clipboards
- 4 Flak jackets
- 1 Set of performance standards (Gunner performance standards listed in FM 44-16S)

PERSONNEL REQUIRED

- 1 Instructor
- 1 Assistant instructor
- 1 MTS civilian technician
- 10 Students

PRESENTATION

Introduction

The instructor briefs the students on the MTS training block. He covers the objectives and provides general information concerning the phases of instruction. During the introduction, he answers any questions that the students may have before classes begin.

Discussion

The students will engage aircraft progressing from a slow target to a very fast target. The main objective of this class is to have the student/gunner operate the weapon system and successfully engage targets without error within a specified time.

The students will operate as a gunner and team chief (coach) allowing for maximum reinforcement of the training. The gunner and coach will alternate positions after every five target presentations.

The stopwatches will be operated by each coach. The times to be taken and reported to the instructor are:

- **Activate-to-launch time**
- **IR acquisition-to-launch time**

NOTE: The watch is started at activate. When the gunner achieves IR acquisition, the time is recorded but the watch is not stopped. IR acquisition is noted by an indication on the performance indicator and/or the audio indicator. The watch is stopped when the gunner pulls the firing trigger. At the end of the engagement, the coach reports the times to the instructor.

The student, when operating as a gunner, will wear ear plugs and flak jacket. The IFF simulator will be attached to an equipment belt or to any loop on his clothing or flak jacket.

A power supply is used to power the THT when operating in the MTS. The power supply adapter which represents the trainer battery must be removed and reinserted after every engagement. It reactivates the trainer.

APPLICATION

This class consists of 17 hours of instruction broken out as indicated below. The 17 hours consist of 2 hours dedicated solely to IR discrimination techniques and 15 hours of aircraft engagement.

1st HOUR
IR DISCRIMINATION

TRAINING OBJECTIVE:

Recognize the target IR tone.

CONDITIONS:

- MTS target IR source is on, without the filter.
- No target film is used.
- The IR source setting is at 50.
- The source is positioned in the center area of the screen.
- The clouds are turned on, but are positioned so as not to interfere with the target source.

SEQUENCE OF ACTIVITY:

- The student is taught how to—
  - Use the sweep and figure 8 methods of acquiring target IR.
  - Use the correct stance and sighting procedures.
- Each gunner will receive 5 tracks with the MTS conditioned as indicated. The IR source will be repositioned to 40 and each gunner will receive 5 additional tracks.
- No stop watch time required.

2d HOUR
IR DISCRIMINATION

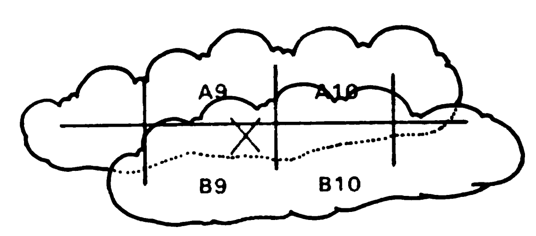
TRAINING OBJECTIVE:

Recognize the target IR tone in relation to background.

CONDITIONS:

- MTS target IR source is on, without the filter.
- No target film is used.
- IR source setting is 40.
- Clouds are positioned so as to overlap around the intersection of A9, B9 and B10. The source is positioned in the cloud overlap areas as shown in the diagram.

SOURCE



SEQUENCE OF ACTIVITY:

- Practice IR acquisition and mechanical skills
  - The gunner obtains added experience in acquiring target IR using the sweep and figure 8 methods.
  - Additionally, reemphasize mechanical skills, e.g., stance and sighting and smooth tracking.
- Each gunner is to receive 5 tracks with the MTS conditioned as indicated. When this is completed, the visible filter will be put on the IR source (making the target source invisible).
- Each gunner will then attempt to locate the target source 5 times using only the weapon's audio indications. When the gunner indicates that he has located the target, the filter will be removed making the target source visible. This allows the determination of target location.
- No stop watch time required.

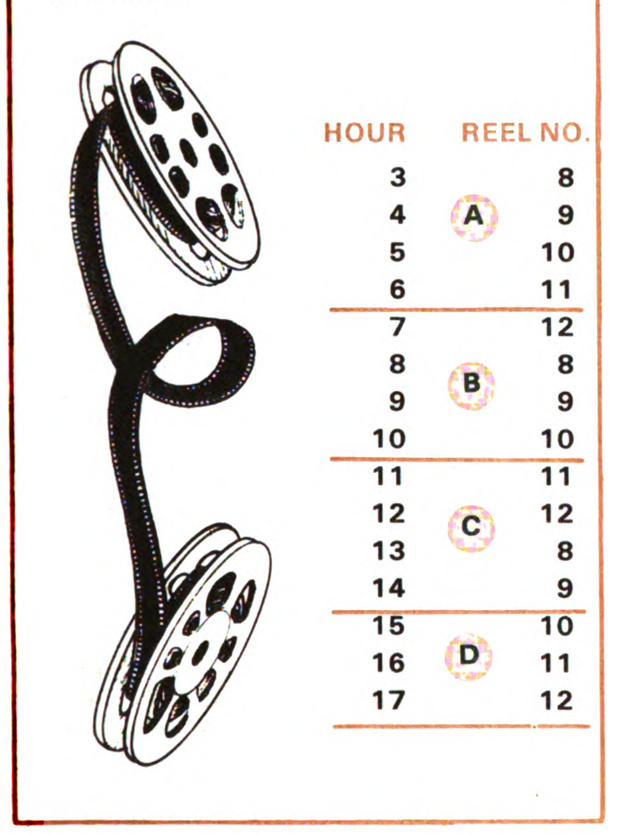
TRAINING TIP:

During this phase, the IR source should be off at least once to note the gunner's reaction. The source can be turned off from the instructor's console.

3d - 17th HOUR

TARGET ENGAGEMENT EXERCISES

The IR source setting is 35-40 for all tracking. The following list shows the class hour and the film reel to be used. Deviations from this schedule are prohibited.



HOUR		REEL NO.
3	A	8
4	A	9
5	A	10
6	A	11
7	B	12
8	B	8
9	B	9
10	B	10
11	C	11
12	C	12
13	C	8
14	C	9
15	D	10
16	D	11
17	D	12



A 3d - 6th Hour ...Reels 8, 9, 10 & 11

TRAINING OBJECTIVE:

Train the gunners on target engagement and tracking exercises, including use of range ring measurements, IFF challenge and response and smooth tracking.

CONDITIONS:

- The clouds are positioned as indicated in Cloud Positions Table. The cloud projector will be turned up to maximum intensity.
- No stop watch time required.



B 7th - 10th Hour ...Reels 12, 8, 9, & 10

TRAINING OBJECTIVE:

To train the gunners in engagement proficiency. This includes the total engagement sequence, range ring measurements, and IFF application.

CONDITIONS:

The clouds are positioned as indicated in Cloud Positions Table for the indicated reels.

STANDARDS:

At the end of this phase of instruction the gunner should be within the acceptable time level and committing no more than 20 percent irrecoverable errors.



C 11th - 14th Hour ...Reels 11, 12, 8, & 9

TRAINING OBJECTIVE:

The objective of this phase is the same as the last phase, that of engagement proficiency.

CONDITIONS:

The clouds are positioned as indicated in Cloud Positions Table for the indicated reels.

STANDARDS:

At the end of this phase, the gunners should be within the acceptable time level and committing no more than 10 percent irrevocable errors.



D 15th - 17th Hour ...Reels 10, 11, & 12

TRAINING OBJECTIVE:

The objective of this phase is the same as the preceding phases, that of engagement proficiency.

CONDITIONS:

Same as preceding phase for the indicated reels.

STANDARDS:

At the end of this phase the gunner should be above the acceptable time level and be progressing toward the time goal with zero irrevocable errors.

TRAINING TIPS:

- The instructor should monitor the gunner's stance. If his stance is improper, it hinders smooth tracking.
- Place the IFF mode switch on the instructor's console to the self-test position. When the gunner challenges the target (presses the interrogation switch) he will not get a response. Note the gunner's reaction.
- Insure the gunners do not hunt for the target with the uncaging switch depressed.
- After the gunners become mechanically proficient in handling the weapon, have the gunners put their heads down until the target is within the engagement boundary.
- Occasionally turn off the IR source and note the gunner's reaction.
- If time permits, the MTS targets can be used for reinforcement of visual aircraft recognition training. However, the gunner must first be proficient in target engagement.
- Encourage competition.
- Put the IFF mode selection switch on the instructor's console in the unknown position for friendly aircraft. Note the gunner's reaction.
- The same tracking head trainer should not be used throughout the MTS training day. The trainer should be rotated every 2 hours.
- To evlauate the gunners's progress, the instructor should note the times the gunner achieves IR acquisition. This is done at least once for every reel of film for each gunner. At the completion of this training, the gunner must pass a test keyed to time and error.



EVALUATION of GUNNER PROFICIENCY

This chapter provides procedures for evaluating the skills of Stinger gunners in handling and firing the Stinger weapon. Since weapons are often not available for live-firing exercises, engagement simulation must be used instead. The Stinger tracking head trainer and the moving target simulator can be used to simulate the engagement process. These devices provide a means for evaluating gunner skills.

CONTENTS

EVALUATION CONSIDERATIONS

The skills and knowledge that a gunner needs to successfully execute a firing sequence are discussed in chapters 3, 4, 5, and 6 of this manual. They are also listed in the soldier's manual for Stinger gunners. The job of the evaluator is to test the gunner to determine if he can correctly perform all the steps of the engagement sequence, within set time limits.

The evaluator grades on a GO or NO GO basis. To pass the test, the gunner must perform all the steps correctly, in their proper order, and within proper time constraints. The tasks that must be performed by the Stinger gunner during an engagement can be divided into two categories for evaluation purposes—weapon handling and decision making.

Weapon handling involves the smooth and efficient operation of the weapon. The gunner must demonstrate mastery of the weapon and its operating controls.

Decision making involves the process of determining if and when certain actions in the engagement sequence are to be performed. These decisions require the application of a number of rules that are based on the type of target being engaged and visual and audible indications received by the gunner during the engagement sequence.

The evaluator must consider the capabilities of the equipment and facilities he has available to him for evaluation purposes:

- The tracking head trainer (THT) can be used to evaluate weapon handling. However, this device used alone does not provide a means for accurately evaluating the gunner's ability at decision making.
- By using the THT with a moving target simulator (MTS), all elements of gunner proficiency can be tested against a variety of targets and target courses. When available, the MTS provides the most accurate means of evaluating gunner proficiency.
- The THT can also be used in conjunction with live targets flying known courses on a tracking range to evaluate both weapon handling and decision making. However, detailed planning and close coordination between the various elements involved in the operation of the tracking range are required to achieve accurate test results.

GUNNER EVALUATION with the MTS

The Stinger MTS provides the most comprehensive means of evaluating gunner proficiency. Both the weapon handling and decision making elements of the engagement process can be accurately assessed against a variety of simulated targets executing courses, speeds, and maneuvers that would be encountered in actual combat.

TARGET COURSES

MTS target reel No. 13 is specifically designed for evaluating gunner performance. The evaluator should consult with the individual in charge of the MTS in selecting target courses and establishing a test scenario. The evaluator must also consult with the individual in charge of the MTS in scheduling the use of the MTS and insuring that the necessary equipment is available and operational. In addition, he must make sure that experienced personnel are present to operate the equipment and to advise and assist him during the conduct of the test.

Prior to conducting the test, the evaluator should familiarize himself with the "Target Run Sheet" for each target run he has selected. Also, the evaluator should familiarize himself with the "Gunner Performance Evaluation Sheet" and the scoring criteria and procedures used with the sheet.

CONDUCT of EVALUATION

The evaluator checks that the MTS equipment is operational and that the selected target runs are ready to be displayed. He also insures that he has the correct target run sheet before him and a stopwatch ready to operate. The evaluator positions the gunner, gives him the THT, and explains how the test will conducted.

Normally, the gunner is given a total of five engagement runs. He must receive a GO on four of the engagements. At the completion of the test for record, the evaluator informs the gunner of the test score, GO or NO GO, and critiques his performance. If the gunner fails the test, the evaluator may, at his discretion, allow the gunner to be given remedial training and then be retested.



GUNNER EVALUATION on a TRACKING RANGE



If a moving target simulator is not available, Stinger gunners can be evaluated against real aircraft. The aircraft is flown over a preplanned course and the engagement is simulated using the tracking head trainer. As compared with the MTS method, this method of presenting targets to the gunner has the advantage of realism but has disadvantages that include:

Less precision in the evaluation. Aircraft courses are more difficult to control and time; therefore, the evaluator must rely more on his own judgement as to exactly when actions in the engagement sequence should occur.

Aircraft support may be difficult to obtain and more expensive in terms of the personnel and equipment required to operate and control them.

A tracking range or suitable training area, target courses, equipment, and materiel must be selected. When actual aircraft are to be used, the evaluator coordinates with the pilot/air operations officer concerning target courses, number of runs, time involved, and communications.

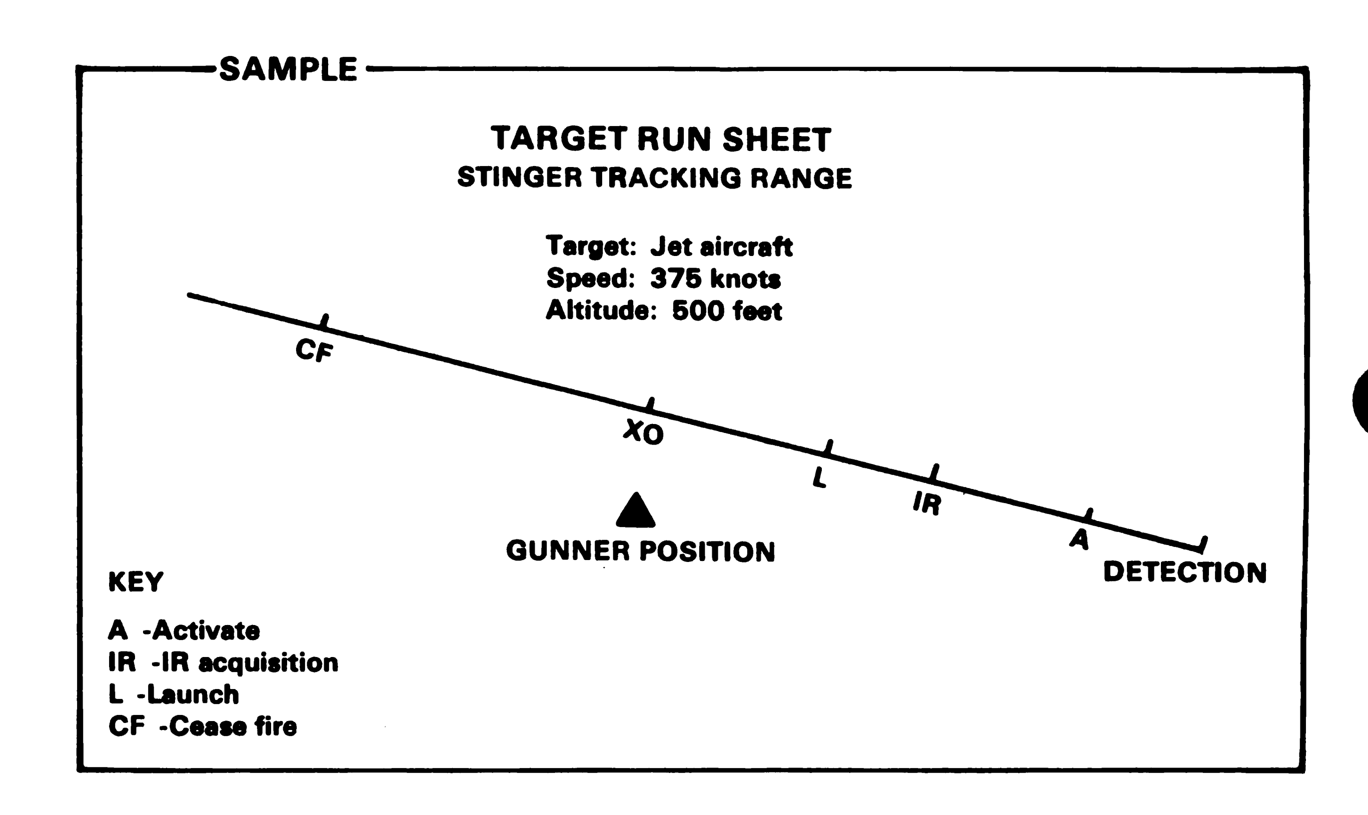
TARGET COURSES

Target courses used to evaluate Stinger gunners should be designed to test the gunner's ability to make correct engagement decisions and to demonstrate correct weapon handling.

AIRCRAFT

If possible, targets should include jet and propeller aircraft and helicopters flying a variety of courses such as:

- **Crossing left to right, low altitude** (high-performance aircraft).
- **Crossing left to right, low altitude** (low/medium-performance aircraft).
- **Crossing right to left** (helicopter).
- **Crossing right to left, low altitude** (high-performance aircraft).
- **Directly incoming, low-altitude** (high-performance aircraft).



Preplanned target courses should be set up so that the evaluator and his assistant know where the launch, hold fire, and cease fire boundaries are located. The data for each course should be preplotted on a graph similar to the target run sheet used with the MTS.

Conduct of the Evaluation

The conduct of the evaluation is the same as on the MTS. Normally, the gunner is given a total of five engagement runs. He must receive a GO on four of the engagements. At the completion of the test for record, the evaluator informs the gunner of the test score, GO or NO GO, and critiques his performance.

SCORING





Gunner performance during a proficiency test can be scored using an evaluation sheet similar to the following example. The sheet may be modified to fit the local situation. The scored elements are listed in the order they usually occur in an actual engagement. The evaluator closely observes the gunner's actions during the engagement sequence and the THT's visual and audible indicators. When evaluating using the moving target simulator, the evaluator looks at the target run sheet for the times at which certain events in the engagement should occur. When evaluating on a tracking range, the evaluator uses the target run sheet prepared for each target course. The evaluator then scores the performance a GO or NO GO on the evaluation sheet. A GO rating is awarded when an action by the gunner is properly performed and no uncorrectable errors are made. The gunner may be scored GO if he recovers from an error and completes the engagement in a satisfactory manner. Additional GO or NO GO scoring criteria can be found in the notes following the sample evaluation sheet.

GUNNER PERFORMANCE EVALUATION SHEET			
Name ______ Date ______			
Organization ______ Score ______			
GUNNER ACTIONS	**EVALUATOR ACTIONS ***	**GO**	**NO GO**
1 Detects aircraft at maximum range. Calls out "DETECT" upon visual detection.	Observes gunner actions. Listens for DETECT call.	☐	☐
2 Shoulders the weapon, unfolds IFF antenna, removes front cover, raises sight, assumes proper stance. *NOTE: BCU has been previously inserted.*	Observes gunner actions.	☐	☐
3 Activates the weapon.	Observes gunner action. Listens for gyro spin up noise.	☐	☐
4 Interrogates the aircraft.	Observes gunner action. Listens for IFF response.	☐	☐
5 Receives IR tone.	Checks that ACQ indicator has changed from BLACK to WHITE. Listens for a distinct acquisition tone. Checks target run sheets for earliest time of IR acquisition.	☐	☐
6 Uncages.	Checks that UNC indicator has changed from BLACK to WHITE.	☐	☐
7 Recognizes IR acquisition.	Listens for a distinct change in IR acquisition tone.	☐	☐
8 Tracks the target.	Observes gunner actions.	☐	☐
9 Determines if jet is within range, by using time count or range ring methods.	Observes gunner actions. Ascertains range method (jets only).	☐	☐
10 Applies superelevation and lead.	Observes gunner actions. Checks that correct indicators change from BLACK to WHITE.	☐	☐
11 Fires.	Observes gunner action. Checks that FIRE indicator changes from BLACK to WHITE.	☐	☐
12 Removes BCU.	Insures BCU is removed immediately.	☐	☐
13 Places weapon on stand.	Observes gunner action.	☐	☐
ERROR: Check ERR indicator which changes from BLACK to WHITE when an uncorrectable error is made. Listen for an error tone. If ERR indicator reads WHITE, score the gunner NO GO.			
EVALUATOR ______ ORGANIZATION ______			

**See Notes for additional scoring criteria.*

NOTES

1 ***Detection.*** If the gunner detects the target at less than maximum range, but in time to successfully engage the target, he should be scored GO. If he fails to detect the target, or detects the target too late to successfully complete the engagement sequence, he should be rated NO GO.

2 ***Shoulder the weapon.*** If the gunner performs the listed events in proper order, he may be scored GO. If he fails to do so, e.g., if he starts the engagement sequence with the sight not locked into position, he should be scored NO GO. If the gunner demonstrates awkwardness in handling the weapon and its controls, he should be scored NO GO. Points to look for include:

- Weapon not balanced on gunner's shoulder.
- Weapon held in a canted position.
- Accidental activation of controls (touching firing trigger or uncaging switch).
- Unable to see through sight properly.
- Lack of good physical control of weapon.
- Gunner not leaning into weapon.

3 ***Activation.*** If the gunner activates the weapon in time to allow early IR acquisition, he should be scored GO. If the gunner fails to activate the weapon, or if he activates too early and is unable to complete the engagement after simulating the removal of a dead BCU and the insertion of a new one, he should be scored NO GO.

4 ***Interrogation.*** If the gunner fails to interrogate the aircraft or does not interpret the IFF response correctly, he should be scored NO GO.

5 ***IR Acquisition.*** If IR acquisition is achieved in time to allow successful completion of the engagement, he should be scored GO. If the gunner does not achieve IR acquisition or achieves it too late to complete the engagement, he should be scored NO GO.

6 ***Uncaging.*** After an IR acquisition tone is received, the gunner uncages the gyro by pressing and holding the uncaging switch. If the gunner fails to uncage in time to successfully complete the engagement, he should be scored NO GO. The gunner may have to make several attempts to lock on the target IR signal. Therefore, the gunner may cage and uncage several times before he can achieve a successful IR acquisition lock on.

7 ***IR acquisition lock on.*** The gunner must obtain an IR acquisition lock on before insertion of superelevation and lead, and prior to firing. If the gunner attempts to insert superelevation and lead, and fires, without obtaining IR lock on the target, he is scored NO GO.

8 ***Tracking.*** If the gunner fails to track properly and loses IR acquisition after uncaging, but reacquires the target IR in time to successfully complete the engagement, he should be scored GO. If he cannot track and maintain IR lock, he should be scored NO GO.

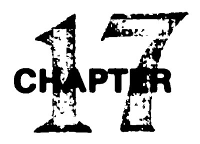
9 ***Determine if jet is within range.*** For ***jets,*** the gunner must determine if the target is within range by applying the correct launch rule. The time count rule is used for crossing jets and the range ring method is used for incoming jets. No outbound aircraft engagements should be attempted when evaluating gunners against actual aircraft.

10 ***Superelevation and lead.*** If the gunner inserts superelevation and lead, he should be scored GO. The gunner is scored NO GO if he fails to superelevate or if he fails to lead properly.

11 ***Firing.*** The gunner should be rated GO if he presses the firing trigger and holds it pressed. If the gunner fires when the target is in a hold fire zone, he should be rated NO GO. The evaluator checks the target run analysis sheet to determine hold fire times and, if the gunner fires after those times, he should be rated NO GO. If the gunner does not continue to track the target while holding the firing trigger pressed for approximately 3-5 seconds after firing, he should be rated NO GO.

12 ***BCU removal.*** The gunner must remove the BCU immediately from the THT. If the gunner forgets to remove the BCU, he should be rated NO GO.

13 ***Placing weapon on rack.*** The gunner must properly place the weapon on the stand for the next engagement. Failure to do so will result in a NO GO rating for this step.



FIELD HANDLING EXERCISES and QUICK-REACTION DRILLS

Stinger teams must react quickly in case of sudden or surprise air attack by hostile aircraft. The speed of modern ground attack aircraft is such that little or no alert warning may be received prior to an attack. Well-trained troops react well in combat if they have been properly trained. Therefore, Stinger team personnel must practice and be proficient in field handling exercises and quick-reaction drills. These exercises and drills can be conducted at section or team level; however, it is recommended that all teams be trained at section level.

CONTENTS

INSTRUCTOR INFORMATION

In this section, some general guidelines for Stinger instructors conducting field handling exercise/quick-reaction drill training are presented. Instructors must be familiar with the exercises and drills involved. Field handling exercises are designed to familiarize gunners and team chiefs with the weapon system. This is done by having the students perform a particular weapon system handling procedure. On the other hand, quick-reaction drills require a high state of proficiency and speed. Instructors should allow team members to practice these drills slowly a number of times until the team members can safely perform them at a quick pace.

DEMONSTRATION

All exercises and drills should be preceded by a live demonstration. Students should be allowed to ask any questions they may have regarding the demonstration. Instructors can then answer these questions to eliminate any confusion before the actual drills begin.

EQUIPMENT

The amount and type of equipment varies with the exercise or drill to be taught. For example, the Basic Load Transport, Container Loading/Unloading Exercise requires an M416 trailer. The Remove IFF Interrogator From Case and Attach to Individual Equipment Belt Exercise does not require an M416 trailer. The order in which the exercises and drills are presented in this chapter may be changed by the instructor to obtain maximum utilization of available equipment.

Equipment required and its intended use follows:

- Radio for use by the instructor for controlling the team and for passing early warning to the team being trained.
- One quarter-ton truck and trailer, with vehicular mounted radio. This equipment is used for the mounted team drill. In addition, it may be used for basic load rearrangement.
- A simulated basic load device, when the team does not have the required number of missile- and weapon-round containers (see app B).
- Binoculars and compass for use by the team chief in orienting and simulating target identification.
- A man-portable radio to be used by the team during the Footmarch Team Drill.
- Sandbags for simulation of a foxhole in the Team Drill from a Foxhole.

The team members must be equipped with their combat gear (including steel helmets, flak jackets, Stinger BCU pouches, etc.) and will use varying items of Stinger equipment, depending on the exercise or drill being taught. The following list shows the exercises and drills discussed in this chapter, along with the Stinger items needed. It is assumed that only one procedure at a time is being taught to one team.

FIELD HANDLING EXERCISES

EXERCISE	EQUIPMENT
1. Basic load transport, container loading/unloading.	Basic load (i.e., 4 WRCs, 2 MRCs) and M416 trailer.
2. Transport harness attachment/removal from ¼-ton trailer.	Basic load (or Simulated Basic Load Device with two weapon-round containers), transport harness, and M416 trailer.
3. Load rearrangement of weapon-round containers after missile expenditure.	Basic load, transport harness, and M416 trailer.
4. Load rearrangement of missile-round containers after missile expenditure.	Basic load, transport harness, and M416 trailer.
5. Remove IFF interrogator from case and attach to individual equipment belt.	IFF interrogator and container.
6. Remove gripstock from weapon-round and install gripstock on missile-round.	Two field handling trainers to simulate a weapon-round and missile-round.

QUICK-REACTION DRILLS	
DRILL	**EQUIPMENT**
1. Ready Stinger weapon to fire.	Basic load (or Simulated Basic Load Device and two weapon-round containers with FHTs), one field handling trainer with dummy IFF interrogator.
2. Mounted team drill.	M151 vehicle, M416 trailer, basic load (or Simulated Basic Load Device with two weapon-round containers), transport harness.
3. Footmarch team drill.	Two field handling trainers.
4. Team drill from a foxhole.	Two field handling trainers.

FIELD HANDLING EXERCISES

These exercises are taught for weapon system familiarization. There is no time requirement. A listing of these exercises follows, along with a step-by-step description of individual actions in the exercise.

BASIC LOAD TRANSPORT -- CONTAINER LOADING/UNLOADING

The purpose of this exercise is to show the team members how to properly load and unload weapon-round containers (WRCs) and missile-round containers (MRCs) using the M416 trailer. Both team members are required to perform this drill because of the weight of the containers and to prevent the dropping of the containers.

Container loading

1 Lift the WRC (two men) using the handles provided at each end of the container.

2 Lift the WRC over the side and into the trailer so that the latches are to the outside.

3 Lower the front of the WRC into the forward end of the trailer and release handle.

4 Slide the WRC forward against the front end of the trailer.

5 Lower the rear of the WRC into the trailer and release it.

6 Place another WRC into the trailer on the other side, and use the same procedure as above.

7 Lift an MRC using the rope handles at each end of the container.

8 Lift the MRC into the trailer and lower it, at the forward end of trailer first, between the two WRCs.

9 Repeat steps for remaining two WRCs and one additional MRC, placing them directly on top of like unit already loaded. Insure that the "ready" weapon- and missile-round containers are on top.



Container unloading

1. Remove the two top WRCs from the trailer by using end handles (two men).

2. Remove the top MRC from the trailer by lifting container using the end handles (two men).

3. Carry containers to designated area.

Remove the two lower WRCs and one MRC from the trailer using reverse loading procedure described above.

Carry remainder of containers to designated area.

TRANSPORT HARNESS ATTACHMENT/ REMOVAL FROM ¼-TON TRAILER

Before this exercise begins, the team should have loaded the basic load (or the simulated basic load device) within the trailer. In this exercise, a transport harness is attached to the trailer to secure the basic load for transport. The team is also shown how to remove the transport harness.

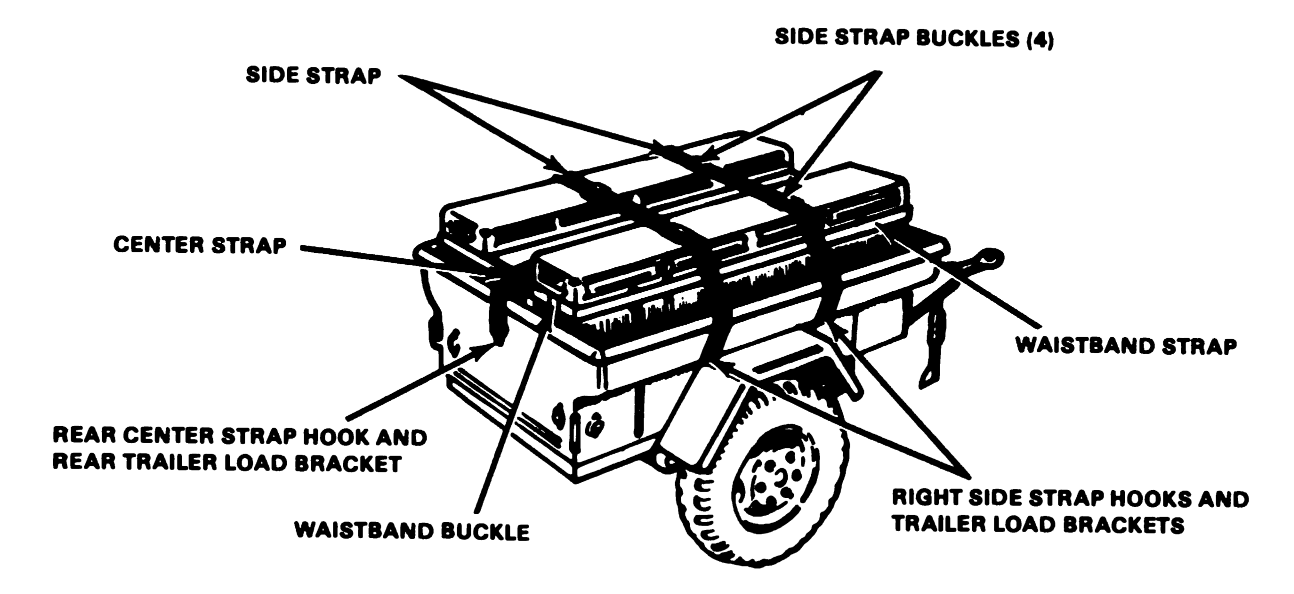
Attachment of transport harness

Unpack transport harness and lay out on a flat surface (e.g., ground).

2. Position the straps as indicated below.

3. One team member positions himself at the rear of the harness directly in front of the center strap buckle (light green) with his right foot near the waistband buckle. Center strap and waistband have only one buckle whereas all other strips have two buckles (black).

***NOTE.* Buckles may have to be unsnapped at this time (for the remainder of the procedure, it is assumed that the basic load has been placed in the trailer).**



4 Straighten out (untwist) all straps.

5 One team member positions himself at the forward end of the harness, the second team member at the rear.

6 Pick up the harness with each man holding one end of the waistband near the left and right side straps allowing the remaining straps to droop.

7 Place the center strap over the loaded MRC, forward to rear with the buckles up, GREEN buckle to the rear.

8 Attach the center strap hooks to the forward and rear trailer load brackets.

9 Spread the straps so that the waistband surrounds the top three containers, letting out slack as necessary.

10 Attach the left and right straps (two each side) to the load brackets on the trailer closest to the fenders.

11 Slightly tighten the waistband and tighten the center strap as tight as possible.

12 Firmly tighten the left side straps (team chief's side).

13 Firmly tighten the right side straps (gunner's side).

***NOTE.* The side straps have to be tightened in the order as indicated to insure that sufficient tension remains on the team chief's strap after the gunner's straps have been unbuckled.**

14 Firmly tighten the waistband.

15 Secure the strap tails of the side straps. The strap tails should not interfere when hands are placed on the outside of the buckles during unlatching operations. Container is still latched.

Removal of transport harness

1 Release tension on right and left side strap buckles. Always release tension on right side first. This may require unlatching, extending strap, and relatching.

2 Release tension on waistband and center straps.

3 Unhook six strap hooks from the trailer load brackets.

4 Pick up the transport harness at waist band and center the strap intersection (two men -- one on each side) and remove.

LOAD REARRANGEMENT of WEAPON-ROUND CONTAINERS AFTER MISSILE EXPENDITURE

The weapon-round containers are rearranged to place an empty weapon-round container under the load. Full weapon-round containers should always be on top and ready for immediate use. Prior to the start of this exercise, the transport harness should be removed.

1 Gunner and team chief five paces from jeep trailer, both with weapons on their shoulders - gunner has fired.

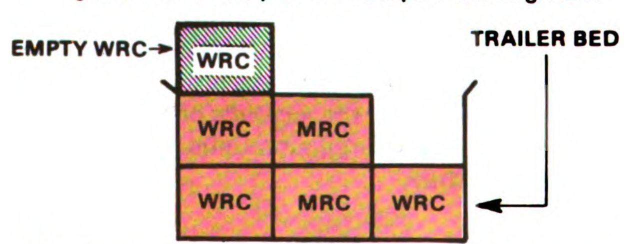
2 Gunner removes gripstock and discards expended launch tube.

3 Team chief places his weapon back into WRC and secures lid with two container latches.

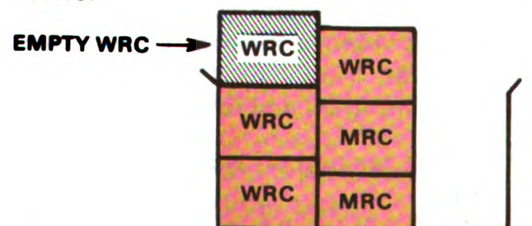
4 Gunner places gripstock into WRC.

5 Gunner closes lid on WRC and latches two latches (center).

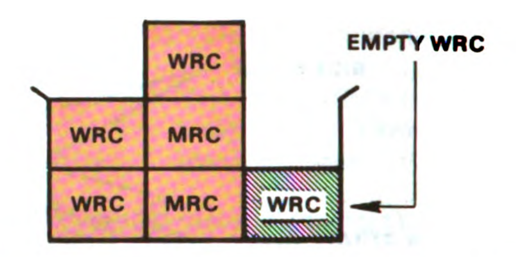
6 With team chief at forward end of trailer and gunner at rear, perform steps 7 through 21.



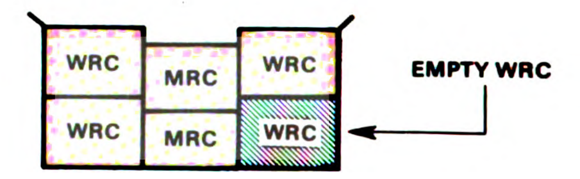
7 Gunner and team chief grasp handles of empty WRC and place on top of the opposite WRC.



8 Gunner grasps handle of bottom WRC and lifts up above the trailer pulling it towards him. Team chief will then grasp his handle. Together they place this WRC on top of the MRCs.



9 Gunner and team chief will then lift the empty WRC and place it in the bottom of the trailer.



10 Gunner and team chief will lift the WRC and place it on top of the empty WRC.

11 Press pressure relief valve of the top WRC to release possible pressure within container. (When air stops flowing, container is depressurized.)

Note. **Container lid is preloaded.**

12 Open WRC lid.

13 Inspect weapon and BCUs in accordance with the technical manual.

14 Remove two BCUs from the WRC and place them in BCU pouches, with the grip end up. Insert third BCU into gripstock.

15 The BCU pouch is located on the front portion of the equipment belt (if pouch is full, place BCUs in jeep).

16 Remove the IFF cable connector dust cover from the gripstock and place inside container.

17 Remove the styrofoam cube from behind the acquisition indicator and place inside WRC.

18 Insure weapon is in proper position inside container.

19 Close and relatch the WRC (two center latches).

20 Attach transport harness.

a. Loosen side straps and connect buckles.

b. Tighten waistband.

c. Tighten side straps.

21 Unlatch two top WRC containers. Load is now in a "ready" position.

LOAD REARRANGEMENT of MISSILE-ROUND CONTAINERS AFTER MISSILE EXPENDITURE

The basic load is rearranged to place an empty missile-round container under the load. Full containers should always be on top for immediate use.

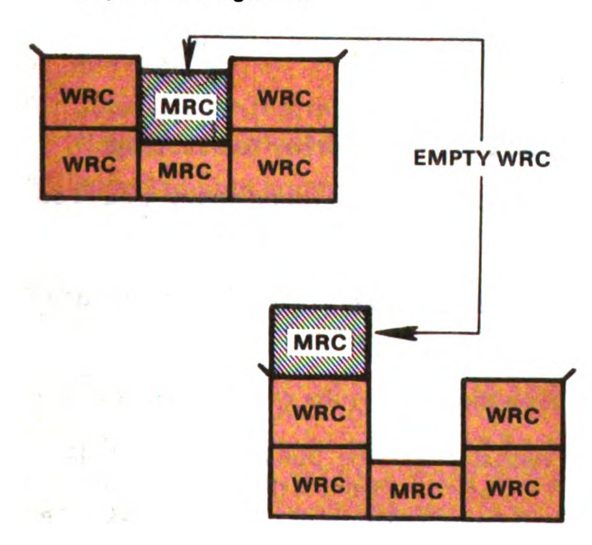
1 Loosen waistband of transport harness.

2 Unbuckle center strap.

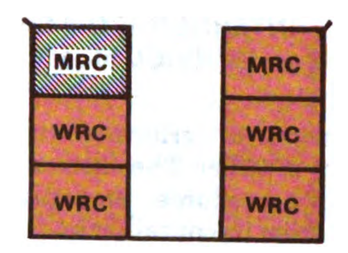
3 Unbuckle one of side straps.

4 Move harness out of the way to allow access to MRCs by folding harness over onto the WRC.

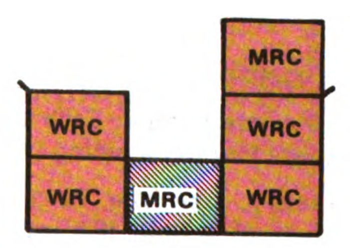
5 With the team chief at forward end of the trailer and the gunner at the rear, perform steps 6 through 15.



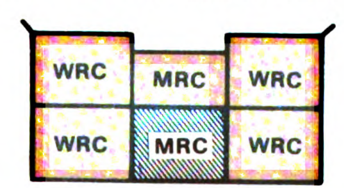
6 Gunner and team chief lift the top MRC and place on top of a WRC.



7 Gunner grasps bottom MRC handle and lifts up, pulling the MRC toward him. The team chief will then grasp his own handle. Together, they lift the bottom MRC out of the trailer and place the MRC on top of the other WRC.



8 Gunner and team chief will then grasp the handle of the first (empty) MRC removed and place it on the bottom of the trailer.



9 Gunner and team chief will then grasp the handle of the second (full) MRC removed and place it on top of the empty MRC in the trailer.

10 Arrange transport harness so it may be secured.

11 Buckle center straps.

12 Tighten waistband.

13 Tighten side straps.

14 Team chief will buckle the two top buckles and tighten straps.

15 Unlatch both WRCs. Load is now in ready position.

REMOVE IFF INTERROGATOR from CASE and ATTACH to INDIVIDUAL EQUIPMENT BELT

This exercise is performed individually by each team member. The exercise consists of two sets of procedures: removing the IFF interrogator from its container and attaching the IFF interrogator to the web belt.

Remove IFF interrogator from container

1 Press the air relief valve on the container, releasing possible pressure inside.

2 Lift the latch paddles on the container and rotate 180° counterclockwise until they are unlatched.

3 Open the container lid.

4 Lift out the interrogator. Take to section headquarters for programming.

5 If necessary, use the TL-29 knife/ screwdriver to attach IFF interrogator battery.

Attach IFF interrogator to the web belt



1 Hold the interrogator in the left hand and place near the web belt, above the right hip.

2 Install the hooking pawls on the interrogator into the eyelets on the belt so that the interrogator hangs over the right hip (belt may have to be removed to ease installation).

3 Attach quick-release clamp on cable end to flak jacket or outer garment for ease of operation.

REMOVE GRIPSTOCK from WEAPON-ROUND and INSTALL GRIPSTOCK on MISSILE-ROUND

The gripstock assembly is reusable. Therefore, all gunners and team chiefs must know how to remove a gripstock from an expended round and mate the gripstock to a missile-round. Two field handling trainers may be used to simulate a weapon-round and a missile-round.

WARNING

BCU must be removed if team members are using live weapon-rounds and missile-rounds in this exercise.

Removing gripstock from expended weapon-round

***NOTE.* Fold sight prior to starting.**

1 Place the expended round on the ground on its sight, with the antenna up.

***NOTE.* Pistol grip should be pointed away from gunner.**

2 Grip the launch tube with the right hand.

3 With the left hand, pull forward on the latch located on the front of the gripstock beneath the launch tube until the latch disengages with a "click." Release latch (a slight inward pressure on the bottom of the gripstock may aid in releasing the latch).

4 Grasp the forward portion of the gripstock with the left hand and pull it gently away from the launch tube.

5 When the gripstock clears the connectors, slide the gripstock forward. Using the right hand, disengage the rear pins.

6 Gripstock is now removed. Discard tube assembly.

Attaching gripstock to a missile-round

1 Remove the missile-round from the MRC, make the missile-round ready for gripstock attachment, and place it in the WRC with the gripstock connections up (remove connector protective cover and discard).

2 Remove cover and pick up the gripstock with both hands and engage pin, located at rear of gripstock, with connector sockets on the missile-round launch tube.

3 Swing the gripstock in an arc about the pins holding the launch tube with the right hand.

4 Push the gripstock toward the launch tube until resistance is met.

5 Hook the forward latch (front of gripstock). This may require placing the index finger of the left hand on the hook and engaging it.

6 Pull the latch rearward against the gripstock, using the thumb and forefinger.

7 Weapon-round is now ready to be configured for a ready-to-fire condition.

QUICK-REACTION DRILLS

The objective of these drills is to obtain a high degree of proficiency including precision, speed, and teamwork in operating the Stinger system.

To be effective, these drills should be:

- Conducted in silence except for commands and reports.
- Supervised so that mistakes are discovered and corrected immediately.
- Repeated until gunner/team reactions are automatic, rapid, and efficient.
- Conducted so that both gunner and team chief can perform all duties within the team.

Stinger personnel will perform in combat in the same manner in which they are trained. Therefore, quick-reaction drills must be carried out with safety always in mind. Safety distances between the team members and other personnel/equipment must be adhered to. For example, a gunner can fire Stinger if he is close to his vehicle. However, if the vehicle is directly in the backblast area, it may be severely damaged. Stinger personnel must also make nearly personnel aware of the danger of the backblast effects.

READY STINGER WEAPON to FIRE

This procedure must be demonstrated and each soldier should perform it several times for proficiency. The weapon-round container/ready rack is open.

1 Grasp weapon with the right hand immediately to the rear of the center dunnage. Left hand is placed at the forward edge of the gripstock.

2 Lift rear end slightly ahead of forward end.

3 Keeping rear end high, lift the forward end high enough to clear the container.

4 Lift, turn, and swing the weapon to the right shoulder.

5 Shoulder weapon; grasp pistol grip with right hand. Make sure index finger is above trigger, resting on the right side of the gripstock.

6 Deploy IFF antenna.

***NOTE.* Two methods are permissible for deploying IFF antenna. Method 1 is the preferred method.**

METHOD 1

a. With the left hand, reach over the top of launcher and grasp top edge of IFF antenna.

b. Pull top edge toward launch tube and lift antenna vertically.

c. Release antenna when it clears the slot and it will unfold without further action.

METHOD 2

a. Holding the weapon with the left hand, reach under the launcher with the right hand.

b. Push inward then upward on the side of the IFF antenna until it clears the slot. The antenna will unfold without further action.

7 Reach forward with the left hand and strike front end cap, knocking it off.

8 Erect sight assembly by placing left thumb under edge. Lift until the sight locks (it should click when in place).

***NOTE.* Interconnecting cable assembly (handgrip) end of IFF cable should be located near right side of gunner's chest.**

9 Insert handgrip connector into the bottom of the gripstock, lining up the two white lines (one on gripstock and one on pistol grip connector).

***NOTE.* This procedure should not be done in a moving vehicle.**

10 Regrasp the gripstock at the uncaging switch position with the left hand and prepare to fire. Gunner calls out, READY. (Do not press the uncaging switch.)

MOUNTED TEAM DRILL



The team is in the team vehicle (M151) moving at a speed of 15 MPH. At the end of the alert radio transmission, the driver (team chief) will safely stop the vehicle. The gunner and team chief dismount as soon as safely possible. Stinger weapons are loaded in the



weapon-round containers with BCUs inserted and IFF interrogator dust caps removed. Weapon-round containers are unlatched but held closely by the weapon transport harness (ready rack configuration).

Gunner actions

1 After the vehicle has come to a stop, dismounts from vehicle and moves to his side of the trailer.

2 Unlatches transport harness.

3 Opens the WRC and removes the weapon-round.

4 Readies the weapon-round (as described in the previous drill) while moving to a safe firing position. This position must be a minimum of five paces away from the right rear of the trailer.

5 Orients toward the direction of approach of the threat aircraft and begins searching for aircraft.

6 Calls out, READY.

Team chief actions

1 After receipt of the alert radio transmission, turns vehicle to the side of the road and brings the vehicle to a safe stop.

2 Dismounts from vehicle and moves to his side of the trailer.

3 Removes weapon-round (but does not ready it for fire).

4 Moves to a position next to the gunner.

5 Places his own weapon on the ground.

6 Orients the gunner toward the direction of the threat; calls out, SEARCH.

7 Assists gunner in searching for aircraft until detection is accomplishad. Detects aircraft.

8 Uses binoculars to identify aircraft as hostile.

9 Issues engagement order.

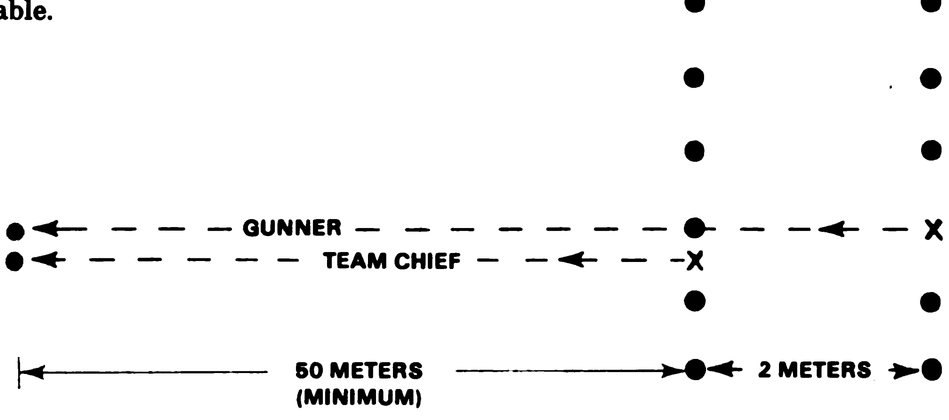
10 Picks up, shoulders, and readies his own weapon for firing.

11 Calls out, READY.

FOOTMARCH TEAM DRILL



The team is in a march column, moving down a road or cross-country, with full field equipment. The gunner and team chief are each carrying a Stinger weapon with a BCU installed. The team chief is carrying the radio equipment. An air guard may be used to call out an alert warning if a man-packed radio is not available.



Gunner actions

1 After receiving the alert warning, unslings and shoulders weapon.

2 Readies weapon while moving to a safe firing position (at least 50 meters from other personnel.

3 Begins searching for targets as directed by team chief.

4 Calls out, READY.

Team chief actions

1 After receiving the alert warning, follows gunner to firing position.

2 Orients gunner to the threat's direction of approach. Calls out, SEARCH.

3 Assists gunner in searching for aircraft until detection is accomplished. Detects aircraft.

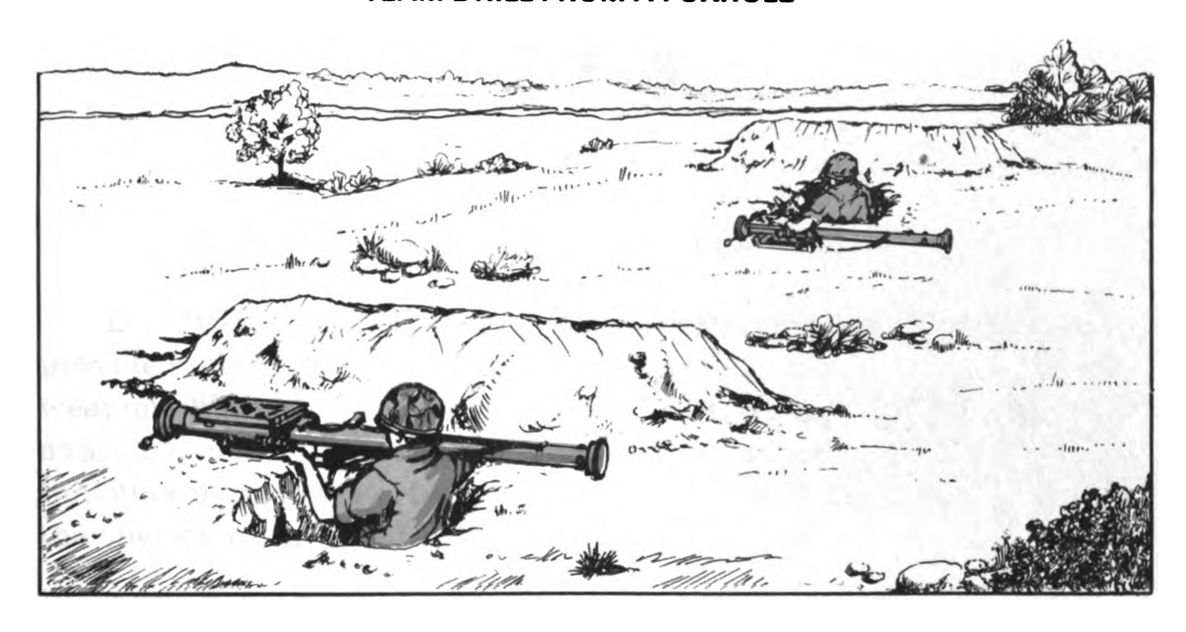
4 Uses binoculars to identify aircraft as hostile.

5 Issues engagement order.

6 Unslings, shoulders, and readies his own weapon for firing.

7 Calls out, READY.

TEAM DRILL FROM A FOXHOLE



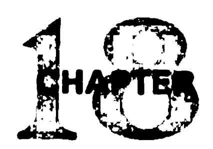
Each team member is in his foxhole. The weapons are lying on the ground close by in a ready-to-fire condition.

Gunner actions

1. After receiving the alert radio transmission, climbs out of his foxhole.
2. Lifts and shoulders weapon.
3. Readies the weapon while moving to a safe firing position. This position must be a minimum of five paces away from his foxhole.
4. Begins searching for targets as directed by team chief.
5. Calls out, READY.

Team chief actions

1. After receiving the alert radio transmission, climbs out of his foxhole.
2. Lifts and carries weapon to the gunner's firing position. Lays weapon on ground.
3. Orients gunner to the threat's direction of approach. Calls out, SEARCH.
4. Assists gunner in searching for aircraft until detection is accomplished. Detects aircraft.
5. Uses binoculars to identify aircraft as hostile.
6. Issues engagement order.
7. Lifts, shoulders, and readies his own weapon for firing.
8. Calls out, READY.



STINGER RANGE OPERATIONS

Live firings are necessary to sharpen Stinger gunner skills and to provide opportunities for gunners to overcome any fear of firing the weapon. With the limited number of ranges and Stinger weapons available, live firings must be prepared, organized, and conducted so that maximum realistic training value is gained. This chapter discusses the operations involved in the live firing of Stinger.

CONTENTS

RANGE RECONNAISSANCE

The Stinger range officer in charge (OIC) should personally conduct a range reconnaissance before his unit occupies the range. The range reconnaissance should provide answers to the following questions:

- How many firing positions can be occupied simultaneously?
- Are tracking positions available for gunners to track targets while live firings are in progress?
- Does the range have a tower?
  - What is its condition?
- Where are landline hookups?
  - Are there communications from existing positions to the range tower?
- Are safety markers visible?
- How is access to the impact area controlled?
  - What are the guard requirements?
- Who furnishes targets?
  - Where are targets stored?
  - Who furnishes target operators?
- Are there duds on the range?

- Who will furnish range flags and fire fighting equipment?
- Where are the following?
  - Concurrent Training Area
  - Mess Area
  - Latrines
  - Helipad
  - Aid Station
  - Troop Break/Billet Area
  - Briefing Tent
  - Vehicle Parking Area

CONDUCT OF FIRING

Poor range administration causes reduced firing time. Violation of established rules can result in a closed range. Range administrative requirements are contained in AR 385-62, local range regulations, medical evacuation (MEDEVAC) procedures, and unit SOPs. These references can be used to plan personnel and equipment requirements. All current references should be placed in a range notebook with directions for handling emergencies. Current references should include local range regulations, AR 385-62, safety regulations, current daily bulletins, and other items required by local policy. Emergency directions should include the MEDEVAC radio frequency and call sign, hospital phone numbers, and directions to the nearest aid station or dispensary.

RANGE LAYOUT

A well-organized range provides maximum firing time. It should be organized to best support the firing. This sample layout shows the support facilities required.



A good range operation SOP will save both time and energy for the Stinger firing. The SOP should include guidelines for occupying the range and describe actions to be taken for specific tasks, such as fighting downrange fires, issuing weapons, and departing the range. TC 25-2, Training Ranges, contains additional information on Army range requirements.

TARGETS

The Ballistic Aerial Target System (BATS) provides Stinger gunners target presentations for use in live firings. With the BATS, target velocities of 250 to 550 knots are obtainable at altitudes of between 90 and 2,100 meters. Procedures for course selection and design with BATS are described in FM 44-102, Procedures for Ballistic Aerial Target System.

RANGE CONTROL

Installations where firings take place will normally have a range control office. This office is responsible for the coordination and safe conduct of range firing for all units using range facilities. Normally, section chiefs will be required to receive a range briefing from this office prior to using a range. This office will also provide a set of local range regulations and policies and will usually require the unit to sign for range facilities upon occupation of the range.

RANGE COMMUNICATIONS

The post range officer controls all ranges by wire or radio communications. The communications system is used for obtaining clearance to fire, making reports, coordination, and ceasing fire. The range communications system enables the range officer to shut down the range immediately in case of emergency.

The OIC controls firing by several means which may include flag, radio, telephone, public address set, or messengers. Wire is preferred for communications with target operators and demolition personnel in the impact area. In all cases, the OIC plans for a backup communications system to prevent delays.

RANGE PERSONNEL

The OIC designates personnel and assigns duties to assist him in preparing and running the range as follows.

Safety Officer or NCO will:

- Assist in fulfilling range safety responsibilities, and insure all safety regulations are enforced.
- Insure that Stinger weapons are handled correctly.
- Enforce smoking prohibitions near the firing positions or weapon storage area.
- Insure misfires are handled as stated in AR 385-62.
- Insure accidents are investigated and promptly reported in accordance with all regulations.
- Insure personnel are clear of the danger area, except as authorized in AR 385-62.
- Insure all range safety requirements (e.g., posting of range guards, raising range flag, establishing safety communications) have been met and are maintained.

NCOIC will:

- Supervise range details connected with range firing.

Ammunition NCO will:

- Insure that all Stinger weapons are delivered and properly stored and secured, both on the range and during transportation to and from the range.
- Insure the range is properly policed of expended launchers and packaging materials.

Target Detail Officer or Senior NCO will:

- Prepare the target launch/control area.
- Provide for transportation of targets to and from the range.
- Draw and turn in targets and related equipment.
- Determine target safety requirements and, in conjunction with safety officer, insure they are met.
- Train target detail personnel in assembly, test, and launching procedures.
- Supervise the operations of target detail personnel.

Firing Station NCO (coach) will:

- Act as an instructor during the firing.
- Insure compliance with safety procedures.

Firefighting Detail

Radiotelephone Operators

Briefing NCO

Medical Aidmen

RANGE EQUIPMENT

The OIC should insure that he has the following on hand:

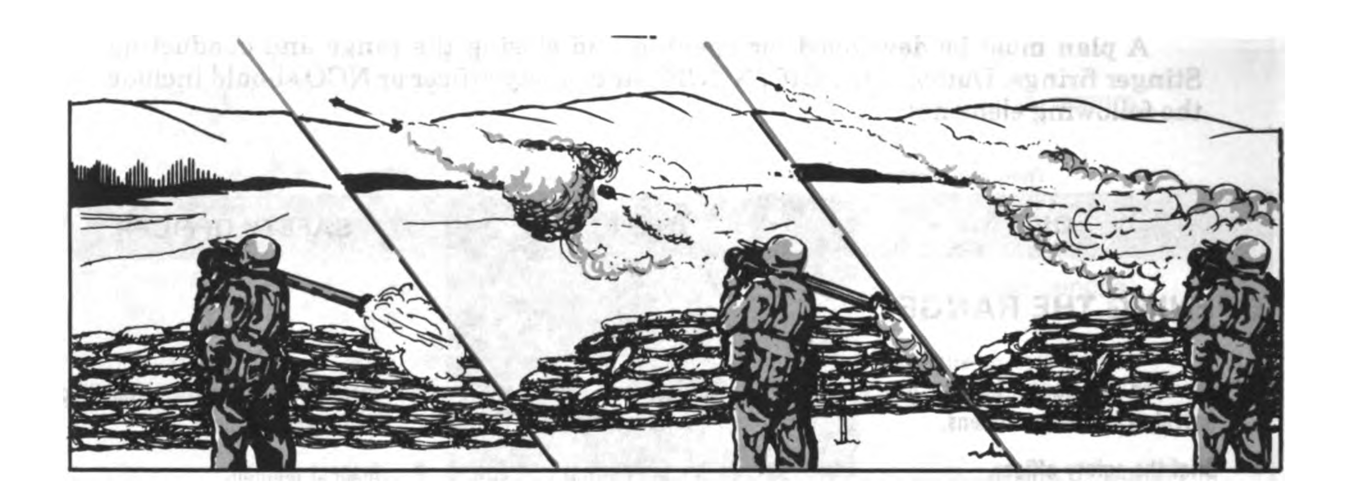
- Targets
- Stinger weapons and trainers
- Range flag
- Public address system
- Briefing tent
- Blackboard, chalk, eraser
- Pens, pencils, grease pencils
- Binoculars
- Field telephones as required
- Latrine supplies
- Trash cans
- Water supply (lister bag or trailer)
- Compass (for marking rounds out of impact area).
- Firefighting equipment (shovels, fire extinguisher, rakes, etc.)
- Vehicles for--
  - Firefighting detail
  - Medical evacuation (primary and alternate)
  - Safety officer
- Equipment needed for concurrent training (e.g., Beseler Cue/See tape cassette players and appropriate TEC lessons)
- All required regulations, SOPs, maps, and overlays

RANGE OPERATIONS PLAN

A plan must be developed for opening and closing the range and conducting Stinger firings. Duties of the OIC, NCOIC, and safety officer or NCO should include the following elements:

OIC	NCOIC	SAFETY OFFICER
OPENING THE RANGE		
• Move to the range before the arrival of the Stinger teams. • Brief the safety officer. • Brief the Stinger coaches. • Brief the Stinger gunners. • Establish communications with range control and insure there are backup communications.	• Supervise positioning of Stinger gunners on the firing lines. • Set up the concurrent training areas. • Supervise weapon issue and target details. • Supervise other administrative details.	• Inspect the storage and handling of Stinger weapons. • Inspect aidmen. • Insure range guards are posted and briefed.
CONDUCT OF FIRING		
• Control the firing. • Maintain communications with range control.	• Supervise all details. • Control movement of personnel from the firing positions to the concurrent training and other administrative areas.	• Insure misfires are handled in accordance with safety regulations. • Observe for any safety violations.
CLOSING THE RANGE		
• Notify range control that firing has terminated. • Debrief the Stinger gunners. • Insure the range is cleared in accordance with local regulations and SOP.	• Supervise the weapon issue and target details. • Supervise the policing and cleaning of the range.	• Insure all misfires are removed from the range. • Insure Stinger weapons are not removed from the range. • Prepare certificates required by the ammunition supply point.

FIRING PROCEDURES



All personnel to fire are given a detailed briefing by the OIC. The OIC discusses the purposes, objective, standards, and firing procedures to be followed. The OIC reviews the Stinger gunnery techniques applicable to the type of firing conducted.

Prior to live firing exercises, gunners will track targets on both left-to-right and right-to-left crossing courses using tracking head trainers. During the firing exercises they will not fire except on orders from the noncommissioned officer assigned to coach each gunner. Gunners on the tracking positions (in barricades) will track and simulate engagements on the same targets assigned to gunners at the firing positions. Coaches (NCOs) will make necessary corrections to gunners on both firing and tracking positions.

On command from the OIC, the gunners proceed to the firing line, draw a Stinger weapon, and go to the designated firing point. The coach (NCO) takes position to the left of the gunner and assures that all safety measures are complied with. He is able to communicate with the OIC/safety officer in the tower.

Three commands will be relayed to the gunner.

ACTIVATE — **The target is coming within range and will be in position for engagement. If all safety precautions are met, the range safety officer gives permission to proceed with firing.**

WEAPONS FREE — **The gunner is free to engage the target when ready.**

CEASE FIRE — **Stop firing.**

Crossover is announced when the target is at crossover to assist the gunner in performing the firing sequence, particularly in the case of high-speed courses (when the gunner fires after crossover).



Helpful Hints for the OIC

REHEARSE — Prior to moving to the range, rehearse your key personnel in setting up the range and in those actions to be taken if something unforeseen happens. This will keep range down time to a minimum.

START ON TIME — Someone else may be waiting to use the range when you finish. Have your targets and communications set up early.

TOWER LOG — Have a good log available, and use people who are conscientious about keeping it correct. As a minimum, the log should have an entry that shows when the unit occupied the range, when permission to fire was received, and who gave the permission.

GUARD — Have a plan to check and change the guards frequently.

FIRES — Be prepared to control fires quickly.

POLICE — A clean range reduces the chance of injury. Police as you go to avoid spending valuable time cleaning up the range after firing.

VISITORS — Have a plan for briefing visitors. Designate someone to handle this for you, possibly a briefing NCO or officer so that you can concentrate on running the range.

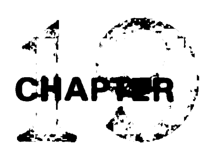
SAFETY MARKERS — The range safety markers must be present before firing can begin. Have spares available.

STINGER WEAPONS and BATS — Insure that you have coordinated closely with the support elements responsible for supplying the weapons and the BATS. This coordination pays big dividends in having the weapons and the BATS on the range at the right time.

CONCURRENT TRAINING — Concurrent training should stress those areas in which the gunner can sharpen his skills in handling and firing the Stinger.

REMEMBER

- Make a good range reconnaissance.
- Organize personnel and details in advance.
- Observe all safety precautions.



OPERATIONAL READINESS TRAINING TEST

An operational readiness training test (ORTT) may be used to evaluate the air defense section headquarters element, teams, and gunners on their ability to conduct air defense operations under simulated combat conditions. Although the ORTT in this chapter has been written for Stinger sections and teams, it can also be modified to include the entire platoon. If the entire platoon is included, additional evaluators are required. However, there may be an insufficient number of evaluators to adequately assess the platoon. This situation may be remedied by designating evaluator teams to check the sections and teams at random.

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OBJECTIVES of the TEST

Determine if the Stinger section can provide responsive and effective air defense support. This determination is made by evaluating their ability to:

- Move tactically from one area to another, maintaining air defense while en route.
- Maintain effective communications.
- Design and execute an effective air defense under changing tactical conditions.
- Comply with the air defense annex to the battalion tactical SOP.
- Maintain materiel.

Determine the combat readiness of individual team chiefs, gunners, and section headquarters personnel.

Determine the status and adequacy of training in the areas of:

- Command and control and communications.
- Visual aircraft recognition.
- Engagement of targets.
- Quick-reaction drills.

NATURE of the TEST

This test is conducted in two phases, tactical and firing (simulated). Each phase is conducted and rated separately, and the resultant ratings are combined for the overall Stinger section rating.

TACTICAL PHASE

The Stinger section can be tested under two conditions. The section can undergo the tactical phase test by itself without troops. It may also be tested during one of its parent unit's field training exercises. In either case, the section provides air defense of its parent unit during simulated combat operations. The tactical phase consists of three parts.

PART I--Defense of Stationary Assets. The section is evaluated on planning for air defense of the supported unit in a static defense posture. Test elements include defense design, RSOP procedures, command and control, and conduct of the defense.

PART II--Defense of Maneuver Units. The section is evaluated on its ability to defend maneuver units against hostile aircraft. For example, a Stinger section is used in defense of a maneuver unit such as the company teams of a battalion task force when they are in contact or moving to contact with the enemy.

PART III--Defense of a Convoy. The section is evaluated on its ability to defend a convoy against air attack from low-altitude hostile aircraft.

FIRING PHASE

During the firing phase the proficiency of individual gunners in target engagement and aircraft recognition is tested. The firing phase is conducted in two parts, simulated target engagements and an aircraft recognition test.

PART I--Target Engagement. Target engagement is simulated using the tracking head trainer to simulate the Stinger weapon. The moving target simulator should be used to test gunner proficiency. The RCMAT may also be used as a target for the test. If a unit is located at or near an installation which has an MTS, the headquarters conducting the test should plan for and use this trainer for conducting this part of the test. Both methods of conducting this part of the test are explained in chapter 16.

PART II--Aircraft Recognition Test. Stinger team personnel, team chiefs, and gunners are tested on their ability to visually recognize aircraft. This part of the firing phase should be conducted in a classroom environment. Use the ground observer aircraft recognition (GOAR) kit or the applicable TEC test lessons. Test only on those aircraft which are relevant to the unit's theater of operations and those aircraft listed in the soldier's manuals for Stinger personnel. Scoring criteria is explained in checklist 4b.

RATING SYSTEM

The rating awarded the air defense section at the conclusion of the test will be ***Satisfactory*** or ***Unsatisfactory.*** The overall rating will be determined by the chief evaluator based on the ratings awarded each area in the checklist. The narrative reports will reflect the degree to which the objectives stated previously were met, citing the strong and weak points of performance and a recommended rating.

The checklists in this appendix will be used as guides for determining these ratings. Local evaluators should expand these checklists for the specific air defense section and situation being tested. Checklists will be scored as ***Satisfactory*** or ***Unsatisfactory.*** Checklist areas that are rated unsatisfactory will be supported by a statement justifying the rating.

At the discretion of the testing headquarters, when a section receives an overall rating of unsatisfactory, a complete retest may be ordered or the section may be retested in the unsatisfactory area(s). The following specific deficiencies will result in an unsatisfactory rating.

MOVE

There is a shortage of two or more vehicles or two or more trailers. The shortage of one vehicle or one trailer may be a deficiency if no provision is made to carry the basic load for the entire section.

Two or more vehicles become nonoperational after reaching the assembly area. A nonoperational vehicle is defined as one which would become a safety hazard to personnel or cause further damage to the vehicle if operated in its current condition.

SHOOT

The section chief's defense design is inadequate to accomplish the assigned mission. An inadequate defense design is defined as one leaving a primary low-level avenue of approach to the defended area unprotected. An inadequate defense design is also one in which the teams are located in such a manner that it would be impossible to engage attacking aircraft prior to their release of ordnance.

Both the section chief and section NCOIC fail the section headquarters test.

Both members of a team fail the aircraft recognition test.

Both members of a team are unfamiliar with Stinger capabilities and limitations, techniques of fire, and command and control procedures.

One or more teams fail to deploy to their assigned positions. The error must be great enough to create a gap in the defense.

COMMUNICATE

Section headquarters personnel fail to monitor the appropriate net for changes in DEFCON, weapons control status, and air defense warning.

The section headquarters is unable to communicate with any team.

Both team members are unable to authenticate or encode and decode coordinates using the CEOI.

TEST RESULTS

A written report of the test results will be submitted by the senior evaluator conducting the test of the Stinger section to the commander. The report should include, but not be limited to, checklists and narrative reports. A narrative report includes:

- Name of the section chief and date he assumed his duties.
- Where and when the test was administered.
- Overall rating awarded the section.
- Local conditions that affected the test.
- Major deficiencies and subject areas where training emphasis should be placed.
- Soundness and effectiveness of the section SOP.
- Justification for modifications made to any portion of the test.
- Number of training hours actually spent in training the Stinger section.

ADMINISTRATIVE DETAILS for OVERALL TEST

The command conducting the test should be responsible for:

- Insuring that the FTX scenario includes tactical situations that are applicable to the testing of the unit's air defense section.
- Coordinating logistical and administrative support for the air defense section portion of the test.
- Arranging for air attacks during the tactical phase of the test and for live aircraft or miniature guided missile target support for the firing phase if an MTS is not available.
- Arranging for the conduct of the firing phase of the test to include:
  - Providing tracking range facilities.
  - Providing an adequate number of training sets for Stinger teams to be tested.
  - Designing courses to be flown by targets during simulated firings.
  - Providing equipment and classroom space for the testing of aircraft recognition.
- Providing technical assistance and advice to evaluators to include:
  - Command and control procedures.
  - Employment and tactics.
  - Communications nets.
  - Training set M134 and MTS M87A1.
- Providing combat service support for the tested unit.

The headquarters administering the test will provide sufficient forward area alerting radars (FAARs) to allow Stinger teams to employ the TADDS and receive early alerting information.

Maps of scale 1:50,000/1:25,000 and aerial photos should be used. (Distribution will be in accordance with unit SOP.)

The chief evaluator conducting the test of the section may modify the test. He can do this to insure that the best use is made of existing facilities, to conform to conditions of the training situation, or to facilitate attainment of training objectives.

TACTICAL PHASE

The tactical phase of the air defense section operational readiness training test can be conducted by modifying the supported unit's field training exercise. This can be done by including air defense situations that will require the section to defend the supported unit against low flying hostile aircraft. The Stinger section is a combat support element of the battalion. Therefore, employment and deployment of the section is based on the tactics employed by the supported unit in attack, defense, withdrawal, movement to contact, defense of moving columns, etc. The section should be tested during all phases of the supported unit's tactical phase with the exception of night operations.

Variations of tactical maneuvers made by the supported unit including retrograde operations, delay on successive positions, relief, etc., will also involve the deployment of Stinger to defend the battalion assets. The checklists covering each of the tactical operations can be modified to include requirements relating to a specific scheme of maneuver. If the supported unit does not conduct all of these type maneuvers, the Stinger section will not be rated for their actions concerning any maneuver omitted. A rigid scenario for each part of the tactical phase is not included because its sequence of timed events could conflict with the scenario of the supported unit.

As each successive part of the tactical phase is tested, the evaluators record training deficiencies. The overall proficiency rating



for each part of the tactical phase is recorded using the tactical phase checklist as a guide. Two checklists are used to evaluate the section's tactical phase. Checklist 1 is used to evaluate the section headquarters element. Checklist 2 is used to evaluate the Stinger teams collectively.

PLANNING and CONDUCT

Notification. The exercise notification message will be delivered to the Stinger section through command channels. The section will be directed to report to an assembly area within 2 hours (plus travel time) from receipt of notification.

Briefing on Situation. Upon arrival at the assembly area, the chief evaluator will brief the section chief. The briefing will include a situation which has a realistic setting for the employment of Stinger. The briefing will contain the mission and administrative instructions dictated by local safety regulations and training area requirements.

Conduct. While the section chief conducts a map reconnaissance and designs his defense, the evaluation team inspects vehicles, equipment, and loading plans. The evaluation team then tests each team's ability to use authentication tables and operations code in the CEOI. When the section chief indicates he is ready, the chief evaluator critiques the defense design.

The section chief will take control of his teams, brief, and deploy them. The chief evaluator will remain with the section headquarters. The remainder of the evaluation team will accompany the Stinger teams to their deployment positions.

During the exercise, changes in weapons control status and air defense warnings are passed to the section headquarters over the supported unit's command net. (The evaluation team vehicle will be equipped with an FM radio.)

Administrative Details for Tactical Phase

Stinger teams will be evaluated on their speed and reaction to air attack during all test requirements.

The headquarters administering the test will furnish required information usually generated by the airspace management element of the tactical operations center in the division (or other sources in the case of nondivisional units). This information includes air alert, changes in weapons control status, and friendly flight information. This information may be transmitted to section headquarters by the evaluator in person or by radio.

An adequate number of FAARs to provide target alerting data to the deployed Stinger teams will be emplaced and operated by FAAR platoon personnel. FAAR frequencies and address codes will be obtained from the CEOI.

Aircraft attacks should be used to evaluate the section's ability to detect and simulate engagement of hostile aerial targets with Stinger. During multiple attacks, each Stinger team will engage the proper target in accordance with the section SOP. Attacking aircraft will fly at various low altitudes and will conform to tactical procedures expected from hostile aircraft. Helicopters should be used in the antitank role, flying nap of the earth and executing attack missions against the force. Liaison with US Air Force and US Army aviation operations personnel should be made sufficiently in advance of the test in accordance with procedures and guidance found in FM 105-5 and higher headquarters SOP.

The headquarters administering the test will allow the tested section adequate time to prepare positions and establish the defense. It will then direct the aggressor to initiate low-altitude air reconnaissance or air strikes against the battalion.

Emphasis will be placed on signal security (SIGSEC) procedures, use of CEOI, etc.

Stinger teams should be required to engage aircraft while masked under specific NBC conditions for a minimum of one aircraft attack.

Supplies of all classes not actually presented will be simulated. Each team should start the test with a full basic load of Stinger weapons. The team can simulate the basic load by having two field handling trainers in their shipping and storage container/ready racks. Also, two additional storage containers and two missile-round containers (all four containers being empty) should be available. Ammunition resupply will be simulated on a one-for-one-basis, using shipping and storage containers or boxes of correct dimensions and weight.

FIRING PHASE

The objective of this phase is to test the ability of the Stinger teams to recognize aircraft and engage aerial targets. The firing phase of the test should be conducted separately from the tactical phase at a time and place designated by the appropriate commander. The firing phase should be conducted in two parts: Part I to consist of a simulated target engagement and Part II to consist of a test on aircraft recognition. Simulated target engagements may be conducted with actual targets at a suitable tracking range or with the Stinger MTS as explained in chapters 15 and 16.

Part I--Target Engagement

Each team chief/gunner is required to engage five separate aircraft flying on courses planned by the testing command. The simulated engagements should be designed to present targets that will test the gunner's ability to visually detect targets, make correct decisions, and to demonstrate correct weapon handling procedures. Two engagements should be conducted under NBC conditions, e.g., gunners masked.

Target courses described below apply to targets used to test gunners at a tracking range. If gunners are being tested at an MTS, the testing command should select five similar courses from appropriate film programs (reels) furnished with the MTS. Each gunner should be tested in the same manner using the same criteria for consistency.

Crossing left to right, low-altitude, high-performance aircraft.

Crossing left to right, low-altitude, medium-performance aircraft.

Crossing right to left, helicopter.

Crossing right to left, low-altitude, high-performance aircraft.

Directly incoming, low-altitude, high-performance aircraft.

Scoring. Evaluators should score the target engagement part of the firing phase, using checklist 4a. (Checklists are located on pages 19-8 through 19-14.) The scoring procedure and evaluation criteria for the gunner is the same whether MTS or the tracking range is used. This is because the tracking head trainer is used for the gunner's evaluation in either case. The evaluator must be familiar with the tracking head trainer and understand the procedures for evaluating gunner performance using the readout capability of this trainer. A complete operational engagement sequence with the trainer during evaluation of gunner proficiency is described in chapter 16.

Part II--Aircraft Recognition.

During the aircraft recognition part of the firing phase test, 20 slides will be exposed for 5 seconds each. The slides should be limited to tactical aircraft which are relevant to the forward areas of the theater of operations. The test should be conducted using the same aircraft and criteria listed in the soldier's manual and SQT for Stinger personnel.

Each gunner should identify the aircraft shown by writing its name or number designation in the space provided on checklist 4b. Sufficient time should be allocated between slides to allow the tested personnel to write their response.

Ratings awarded during Parts I and II of the firing phase should be transferred to checklist 5 for use in the final ORTT summary.

EVALUATOR PERSONNEL

The requirements of the test must be thoroughly explained to all individuals in the section to be tested. Each evaluator must question personnel of the tested unit and must closely observe their performance so that he can rate effort and ability fairly and completely. In no case will members of the section being tested be detailed as evaluators. Evaluators will not give instructions or advice to unit personnel other than that necessary for the conduct of the test or to insure safety.

PERSONNEL

The test requires two evaluator officers, one of whom will serve as senior air defense section evaluator, and two enlisted men. The two officers should be helped by two qualified enlisted evaluators. Officers selected as Stinger evaluators should be experienced in the use of forward area air defense weapons and air defense tactics and also be familiar with the characteristics, capabilities, and limitations of the Stinger weapon. Enlisted evaluators should be qualified Stinger gunners and also be proficient as vehicle drivers and radio operators. One officer, assisted by an enlisted man, should act as evaluator of the section headquarters during the tactical phase while the other officer and enlisted man act as evaluators for Stinger team performance. During the firing phase, the evaluators should work together in evaluating gunner skills in engaging targets and in aircraft recognition.

DUTIES

Each evaluator will perform his assigned duties in accordance with instructions given by the senior evaluator. He also will:

- Study and understand the checklists, scoring system, local conditions affecting the scoring, and any SOPs in effect during the test.
- Fairly determine by direct observation, ratings for each test activity to be entered on the appropriate checklist.
- Submit a narrative report to summarize ratings indicated on the checklists and take part in the critique when so requested by the chief evaluator.

CHECKLISTS

Checklists found in this chapter may be used in whole or in part, but it is highly recommended that local commanders review them to insure that they fulfill the training objectives in his unit. The commander and evaluators must refer to the latest pertinent field and technical manuals, local directives, and the unit SOP for current applicable information as a basis for revising the checklists.

TACTICAL PHASE

Checklist 1 is used to evaluate the air defense section headquarters. The evaluator should check the S or U (satisfactory or unsatisfactory) column in the space provided for each item. After completing the checklist, the evaluator should award an overall rating to the section headquarters element. This overall rating should also be recorded in the appropriate space on checklist 3.

Checklist 2 is used to evaluate the Stinger teams during the tactical phase of the test. A separate checklist should be completed for each Stinger team. Team scores are entered in the appropriate spaces in checklist 3.

Checklist 3 is used to sum up the tactical phase ratings for the tested unit. The ratings awarded should approximate the average of a and b of checklist 2. The tactical phase scores from checklist 3 will be transferred to the appropriate spaces in checklist 6.

FIRING PHASE

Checklist 4a is used to score individual team members in their ability to engage aerial targets with the tracking head trainer.

At least four engagement ratings of "S" for each action in five engagements must be obtained before an overall score of "S" can be entered in the right-hand column. A separate checklist should be completed for each Stinger team chief and gunner. At least 80% overall scores of "S" must be obtained before the final grade of "S" can be assigned in checklist 4a.

Checklist 4b will be used to score the individual in aircraft recognition skills. These scores will be converted to ratings according to the rating scale at the bottom of checklist 4b.

Checklist 5 is used to summarize the firing phase ratings for the tested unit. Final ratings for checklists 4a and 4b will be entered on checklist 5.

Checklist 6 is used to sum up the tactical and firing phases for the tested unit and arrive at an overall score.

Checklist 1, Section Headquarters

SECTION CHIEF. Did the section chief accomplish the tasks listed below?

	S	U
• Initiate planning upon receipt of order.		
• Organize this section for combat to support the mission (except when accomplished by battalion).		
• Brief his section personnel on mission.		
• Maintain close coordination with staff members in planning for anticipated operations.		
• Advise the commander as to the air threat.		
• Actively advise the unit commanders on matters pertaining to Stinger employment.		
• Supervise and coordinate the tactical operation of his section.		
• Design the defense on a reasonable evaluation of the air threat.		
• Deploy Stinger teams to allow early engagement where possible.		
• Continually evaluate the defense.		
• Advise the unit commanders on employment of non-air-defense weapons against hostile aircraft; e.g., small arms and automatic weapons.		
• Keep the commander informed on the state of combat readiness of Stinger teams.		

SECTION HEADQUARTERS PERSONNEL. Did the appropriate section headquarters personnel accomplish the tasks listed below?

	S	U
• Establish communications with each team.		
• Require an acknowledgement from each team of the receipt of important instructions or changes in status.		
• Provide the teams with FAAR locations and TADDS frequency data.		
• Monitor TADDS/early warning.		
• Transmit early warning to teams in sufficient time to be of value (if applicable).		
• Use proper radio operating procedures in accordance with CEOI.		
• Adhere to SOP for communications security (COMSEC).		
• Make a map reconnaissance to locate primary and alternate positions.		
• Give instructions concerning radio silence (when applicable).		
• Change and update the defense in time to meet the requirements of the situation.		
• Insure that each team knows the location of friendly air corridors.		
• Requisition shortages or take action to make replacement promptly.		
• Have equipment on hand as provided by unit TOE.		

	S	U
• Maintain a situation map showing the current tactical situation, location, and coverage of each Stinger team.		
• Arrange for team local security when needed and if possible.		
• Arrange for team ammunition resupply.		
• Maintain an operations journal of all changes in weapons control status.		
• Verify that each team is operating in accordance with the current air defense weapons control status.		
• Maintain ADA annexes for the supported unit SOP which includes as a minimum:		
• Hostile target criteria.		
• Targets to be engaged under each air defense weapons control status.		
• Criteria for target selection during multiple attack.		
• Team action in case of loss of communications.		
• Responsibilities and duties of all air defense section personnel.		
• Demonstrate knowledge of capabilities and limitations of Stinger system as presented in FM 44-18 and FM 44-1A.		
• Analyze the situation and select the best method of Stinger employment on the move; e. g., leap-frogging, dispersing throughout the column, or accompanying elements.		
• Recommend best deployment method for defense of maneuver units to the commander.		
• Designate sectors of fire to each team where applicable.		
• Coordinate the movement of teams with movement of the supported unit to provide as much continuous coverage as possible.		
• Provide sufficient maps for the teams.		
• Maintain operations during succession of command if loss of key personnel occurs.		
• Notify all teams of a nuclear, biological, or chemical attack.		
• Demonstrate how to program the IFF interrogator.		

NOTE: The senior evaluator will select one man to either explain or do the programing.

• Rating ....

Checklist 2, Stinger Teams (Tactical Phase).

a. TEAM CHIEF. Did the team chief perform the following tasks?

	S	U
• Supervise the team gunner.		
• Keep the section chief informed of his team's location at all times.		
• Comply with the rules of engagement in accordance with the prevailing weapons control status and hostile criteria.		
• Comply with special friendly flight information when received.		
• Comply with rules for target selection.		
• Make a positive identification of aircraft.		

NOTE: When the members of the team are separated and each is to engage targets separately, each member will make positive hostile identification prior to engaging.

• Properly emplace and monitor TADDS.		
• Keep section headquarters informed of operational status of TADDS.		
• Make an after-action report after each engagement in accordance with unit SOP.		

b. TEAM CHIEF and GUNNER. Did the team member perform the following tasks?

• Respond to each signal as prescribed in Appendix B, this manual.		
• Demonstrate proper radiotelephone procedures.		
• Keep radio traffic to a minimum.		
• Maintain communication during movement.		
• Establish radio communications immediately upon occupation of position (if appropriate).		
• Have knowledge of operating frequencies and call signs of all other stations in the section net.		
• Take proper action during jamming activities.		
• Have knowledge of authorized alternate frequencies and call signs.		
• Change radio frequencies (when required).		

	S	U
• Install and use wire communications when time and tactical situation permit.		
• Respond promptly to orders to move to new positions.		
• Conduct a ground reconnaissance of the designated position(s).		
• Select a position which affords a good field of view along the most probable avenue of aircraft approach.		
• Consider backblast clearance in selection of the position.		
• Use the designated route to the position.		
• Conceal and camouflage the team vehicle and trailer during occupation of position.		
• Remove or conceal vehicle tracks leading into the position.		
• Organize and improve the position promptly after the initial occupation, tactical situation permitting.		
• Prepare foxholes or prone positions for team protection.		
• Perform their mission from the selected position.		
• Observe noise, light, and camouflage discipline.		
• Select an alternate site as soon as possible after occupation of the primary position.		
• Have individual weapons ready for immediate use and make contact with other friendly elements in the area.		
• Maintain a condition of combat readiness as prescribed in SOP.		
• Adhere to the provisions of the NBC defense SOP.		
• Perform search and scan procedures as prescribed in chapter 4, FM 44-18-1.		
• Detect and identify aircraft in time to be successfully engaged.		
• Employ hostile criteria as an aid in identifying Aggressor aircraft.		
• Have knowledge of Stinger system capabilities and limitations as presented in FM 44-1A.		

	S	U
• Employ technique of fire rules during simulated engagement of Aggressor aircraft.		
• Demonstrate proper weapon handling technique when engaging targets.		
• Have a knowledge of procedures for handling misfires, hangfires, and duds.		
• Check vehicle, weapons, and communications equipment prior to the tactical operations.		
• Provide maximum air defense coverage for attacking elements commensurate with team survivability.		
• Accompany assault troops during airborne/airmobile operations and after landing, move quickly to designated position(s).		
• Comply with all safety procedures listed in appropriate regulations, field manuals, and technical manuals.		
• Safeguard the Stinger weapons according to SOP.		
• Have all team equipment as prescribed by TOE.		
• Perform required operator maintenance on the Stinger weapon (field handling trainers) as prescribed in TM 9-1425-429-12.		
• Perform before-, during- and after-operation services on the vehicle and trailer as prescribed in the applicable technical manual.		
• Perform required maintenance on communications equipment.		
• Adhere to the vehicle loading plans.		

• Rating ....

CHECKLIST 3—TACTICAL PHASE SUMMARY

TACTICAL PHASE AIR DEFENSE SECTION STINGER

UNIT	CHECKLIST 1	CHECKLIST 2		TACTICAL PHASE RATING
		A	B	
Air Defense Section Headquarters				
Team A				
Team B				
Team C				
Team D				
Team E				
Team F				
Team G				

Air Defense Section Rating:

Satisfactory ____________________

Unsatisfactory ____________________

CHECKLIST 4—INDIVIDUAL GUNNER PROFICIENCY--FIRING PHASE

4a—Target Engagement

Name ____________________ Date ____________

Organization ____________________ Score ____________

GUNNER ACTIONS	ENGAGEMENTS					OVERALL SCORE	
	1	2	3	4	5	S	U
(1) Shoulders the weapon, unfolds IFF antenna,removes front cover, erects sightassembly, inserts IFF connector into gripstock, and assumes proper stance.							
NOTE: BCU has been previously inserted.							
(2) Detects aircraft at maximum range.							
(3) Interrogates the aircraft.							
(4) Classifies target by class.							
(5) Tracks the target.							
(6) Activates the weapon.							
(7) Receives IR tone.							
(8) Uncages.							
(9) Recognizes IR acquisition.							
(10) Positively identifies aircraft.							
(11) Applies superelevation and lead.							
(12) Fires.							
(13) Removes BCU immediately.							
(14) Places weapon on stand.							
SCORE							

Refer to Gunner Performance Evaluation Sheet for information on penalty points. The criteria is listed on page 16-9. Scoring information is discussed on page 19-6.

4b—Aircraft Recognition Test

Team Chief/Gunner's Name ______________________ Unit ______________

Date ______________ Evaluator's Name ______________________

NO	AIRCRAFT	ID CORRECT	ID INCORRECT
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
	RATING	S ______	U ______

RATING SCALE: 18-20 correct answers = S
17 or less correct answers = U.

CHECKLIST 5—FIRING PHASE SUMMARY

Unit ______________________ Date ______________

TEAM	INDIVIDUAL GUNNER PROFICIENCY-TARGET ENGAGEMENT Rating: S or U	AIRCRAFT RECOGNITION TEST Rating: S or U	OVERALL TEAM FIRING PHASE RATING Rating: S or U
A			
B			
C			
D			
E			
F			
G			

Overall section firing phase rating (S or U) ______.

NOTE: For an overall section rating of S, the total Ss in the first two rating columns combined must be at least 80% of all S and U ratings entered in these columns.

CHECKLIST 6—ORTT Summary

Organization ______________________ Date ______________

UNIT	TACTICAL PHASE Rating: S or U	FIRING PHASE Rating: S or U	OVERALL RATING Rating: S or U
SECTION HQ			
Team A			
Team B			
Team C			
Team D			
Team E			
Team F			
Team G			

Legend: S = Satisfactory
U = Unsatisfactory



EMERGENCY WARNING SIGNALS

Air attacks will be swift and often unexpected. Therefore, early warning of a probable attack is necessary to give troops a chance to take cover. This warning may be passed through normal command channels, or given by local OPs, Stinger teams, or air sentries. All OPs should have air watch included in their duties, and alertness for enemy aircraft required as part of normal observation. They will not always have a good view of the air around them, in which case a special air guard must be detailed. All vehicles should have an air guard detailed. High-speed, low-flying aircraft are difficult to identify.



Hostile low-flying aircraft may appear suddenly from behind low hills, belts of trees, or haze. To gain surprise, they will try to attack you with the sun behind them.

The alarm must be given immediately if troops working in the open are to have any chance of taking cover. This warning is the responsibility of every man in the area and will be passed by whistle, voice, radio, or any other method. The whistle signal is a series of long blasts. When the alarm is given, all troops except those in close contact with the enemy must immediately take cover, if possible, below ground level, and remain there until the all-clear is given.

Evasive maneuver is the initial reaction of mounted units under air attack. Each vehicle turns away from an airplane's axis of attack and seeks cover and concealment. They then shoot at attacking aircraft as appropriate.

STINGER PERSONNEL MUST UNDERSTAND ALL WARNING SIGNALS AS PRESCRIBED IN UNIT SOP

To provide a standard method of disseminating emergency warnings within NATO forces operating on land, the United States Armed Forces have concurred in the provisions of STANAG 2047 (Emergency Alarms of Hazard or Attack). Pertinent extracts from STANAG 2047 suitable for use by Stinger team personnel are listed below--

HAZARD	SOUND SIGNAL	VISUAL SIGNAL
NUCLEAR, BIOLOGICAL, CHEMICAL (NBC).	A rapid and continuous beating on any metal object or any other object which produces a loud noise. A horn or siren signal of three short blasts followed by 3 seconds of silence and repeated for 1 minute. Shout "Gas" or "Spray" after donning protective mask. Automatic alarms should replace above warning signals insofar as possible.	Donning of protective mask and equipment IAW SOP.
AIR ATTACK.	Continuous series of long blasts on a vehicle horn, whistle, bugle, or other wind instrument; long warbling blast on a siren.	Rapid crossing of arms extended above head.
GROUND ATTACK.	Series of short blasts on vehicle horn, whistle, bugle or other wind instrument.	IAW SOP.
FRIENDLY NUCLEAR STRIKE.	IAW SOP.	IAW SOP.
ALL CLEAR.	Orally or by continuous sustained blast on vehicle horn, whistle, bugle, or other wind instrument. Steady blast on siren for 1 minute.	IAW SOP.

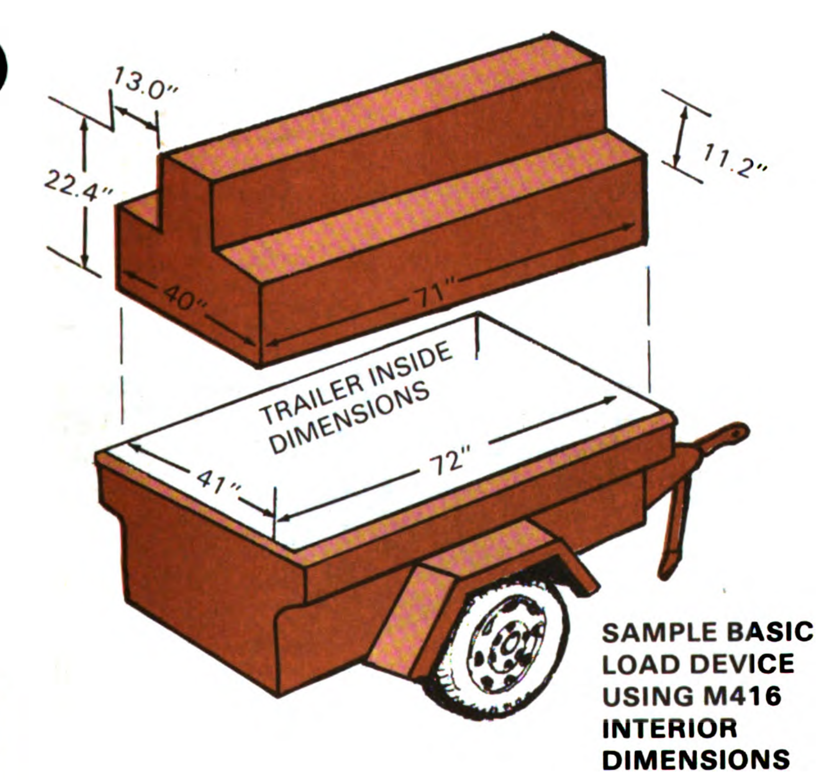
NOTES:

1. **If an air or ground attack is determined to be a nuclear, biological, or chemical hazard, the appropriate NBC hazard alarm should replace or immediately follow the air or ground attack alarm as appropriate.**
2. **The spoken word (vocal alarm) remains the most effective means of informing troops in an emergency.**



APPENDIX B
SIMULATED BASIC LOAD DEVICE

Normally, during team-level training, only one field handling trainer (FHT) is available to each team. This presents a problem during field handling/quick-reaction drills, when a complete basic load of weapon- and missile-round containers is needed. These drills require that the container/ready rack be located on top of the other weapon containers, on either the right or left side of the trailer. With only one container, the necessary height and accessibility of the ready rack cannot be duplicated. There is also a problem in securing the lone container/ready rack in the trailer bed to prevent its movement and possible damage.



SAMPLE BASIC LOAD DEVICE USING M416 INTERIOR DIMENSIONS

A wooden frame to simulate the missing containers of the basic load can be constructed to fill this need. This device can be made by the local Training Aids Support Center (TASC). The simulated basic load frame can be constructed of plywood in this manner:

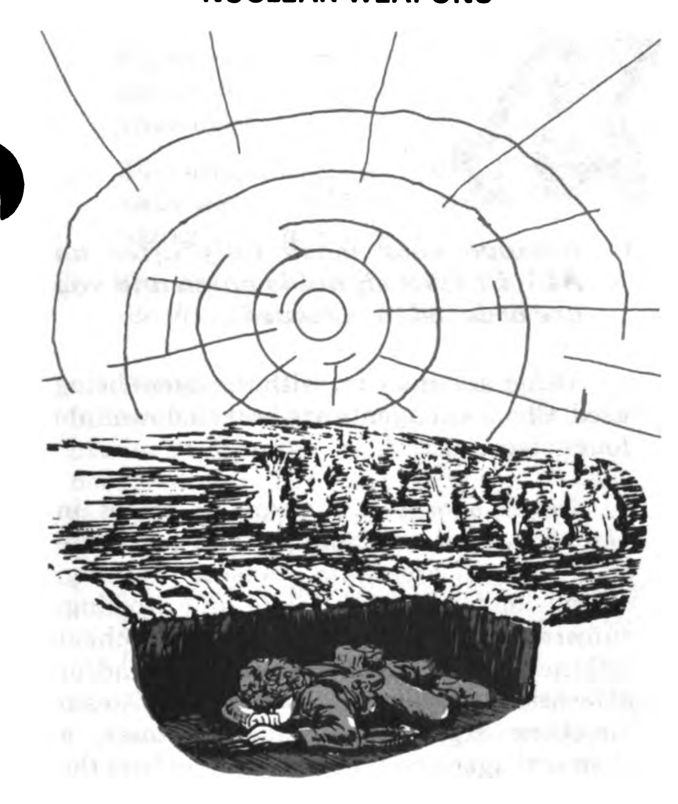
For those exercises requiring the gunner and team chief to each handle a weapon, it is suggested that a FHT be borrowed from another team. An allowance for the extra weapon is built into the frame's design.



STINGER in an NBC ENVIRONMENT

Stinger personnel must be prepared to fight in a nuclear, biological, and chemical (NBC) environment. Failure to prepare for NBC warfare will result in severe losses of men and equipment when threat forces employ NBC agents. This appendix describes some of the characteristics of NBC warfare agents and the preventive and defensive measures that Stinger team members can take to survive in this environment.

NUCLEAR WEAPONS



A nuclear explosion should be easy to recognize. It is more powerful than any other explosion and is accompanied by a high-pressure wave (blast). Immediate actions for Stinger team members in the open or in foxholes, are:

1 *Drop flat on the ground or to the bottom of your foxhole and cover your face. This lessens the chances of being hit by flying debris or of being flung by the blast.*

2 *Do not look in the direction of the explosion or directly at the fireball. The extreme heat (und light) of the explosion is called thermal radiation. Stinger team members looking directly at the fireball can have their eyes temporarily, or in some cases, permanently damaged. Thermal radiation can also ignite objects nearby and cause fires, or cause skin burns to exposed individuals.*

3 *Stay down until after the blast has passed and debris has stopped falling.*

4 *Count the number of seconds between the flash of light and the explosion, if possible. The team chief submits this information as an NBC 1 report.*

5 *Stay calm; check for injuries and damaged equipment. Prepare to continue your mission.*

CHEMICAL and BIOLOGICAL WEAPONS



CHEMICAL AGENTS

Chemical agents are released to cover fairly large areas. They can be released by artillery, rockets, bombs, or sprayed by aircraft. These agents may be in the form of gases, aerosols, or liquids, and may be colorless and/or odorless. A good defensive measure against chemical attacks is to wear protective clothing.

Perform the following procedures as quickly as possible, if a chemical agent is detected:

1 ***Stop breathing.***

2 ***Put on your protective mask.***

3 ***Clear and check your mask.***

4 ***Resume normal breathing.***

5 ***Sound the NBC alarm.***

6 ***Remove your mask only after an ALL CLEAR signal is given and you are ordered to remove it.***

Other actions vary with the agent being used. Chemical agents are broken down into four categories:

Nerve agents are normally found in aerosol, vapor, or liquid form. They cause difficulties in breathing, nausea, vomiting, convulsions, excessive saliva and drooling, running nose, stomach cramps, chest tightness, and involuntary urination and/or defecation. If one or both Stinger team members experience these symptoms, a chemical agent may be present. Perform the following actions immediately if a nerve agent is detected:

1 ***Use one nerve agent antidote injector.***



2 *Give yourself another injection if more than 5 minutes have passed and the symptoms remain.*

3 *Seek medical help if symptoms do not disappear after the second injection.*

4 *Decontaminate any agent on your skin using M258 Decon Kit.*

5 *Decontaminate any agent on your clothing using M13 Decon Kit.*

Blister agents come in liquid form. When the liquid comes into contact with the skin, it will sting, burn, or cause severe blisters. If the agent comes into contact with your eyes, it can lead to permanent blindness. Perform the following if a blister agent is encountered:

1 *Flush eyes immediately with water if agent has come into contact with your eyes.*

2 *Decontaminate any agent on your skin using M258 Decon Kit, or by using soap and water.*

3 *Decontaminate any agent on your clothing using M13 Decon Kit.*

Blood agents come in vapor (gas) form. Individual reactions to these agents are headache, dizziness, pink skin color, eye and nose irritation, nausea, convulsions, slow or rapid breathing, rapid heart beat, and coma. If these symptoms appear, you should:

1 *Crush two amyl nitrate ampules and place them inside the facepiece of the mask, next to the eyes.*

2 *Repeat step 1 every 4 or 5 minutes until normal breathing is restored.*

3 *Do not use more than eight ampules unless you have a medic's approval.*

4 *Artificial respiration may be necessary.*

Choking agents come in vapor (gas) form. Signs to watch for include coughing, choking, nausea, and headache. These agents will cause damage to your lungs and flood them with body fluids. If any of these symptoms develop, follow these procedures:

1 *Let the other team member or a buddy know.*

2 *Take cover.*

3 *Keep warm.*

4 *Move only if necessary.*

BIOLOGICAL AGENTS

Biological agents are spread in aerosol form by using explosive bomblets, missiles and aircraft (with spray tanks), and generators. They are also spread by insects (vectors), such as mosquitoes, flies, mites, ticks, and lice. If warning is received of a biological attack, don your protective clothing and mask and follow your leader's instructions. The most likely time for a biological attack is in the evening and early morning hours, or on cloudy or foggy days, because direct sunlight will kill most of the germs.

Observe these preventive measures to reduce the effects of potential exposure to biological agents:

- Practice good hygiene.
- Clean all wounds and cuts well.
- Keep your immunization shots up to date.

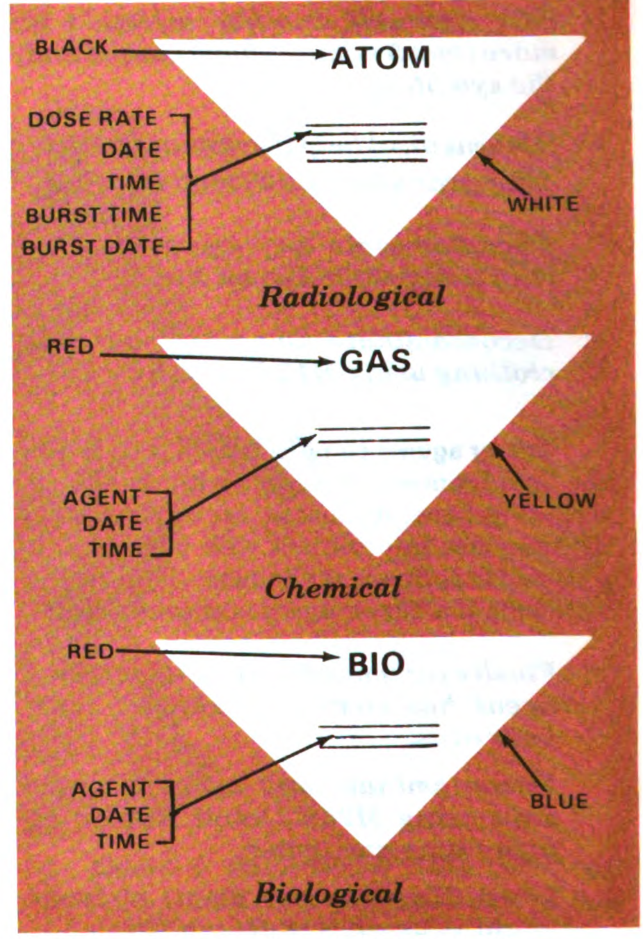
If a biological attack is initiated:

1 *Keep all protective clothing buttoned up and wear your mask until the ALL CLEAR signal is given.*

2 *Eat and drink only from containers that have been sealed.*

NBC CONTAMINATED LAND AREAS

As soon as possible following an NBC attack, units will mark off areas where contamination is still on the ground, plants, or bushes. Markers indicating the type of contamination will be used. These markers are different colored triangles for each type of contamination with ATOM, GAS, or BIO printed in large letters on the front side only. Units will indicate on the front (side of marker away from the contaminated area) of GAS and BIO markers, if known, the contaminating agent and the date and time of contamination. ATOM markers may indicate the dose rate, date, and time the dose rate was measured, and, if known, the burst date and time. If you come to one of these signs - STOP! If you can read this information, don't go any farther. If you do not see any written information on the sign, you have just walked through a contaminated area. Check the other side of the marker to determine the contaminating agent, check yourself for contamination and decontaminate yourself as previously outlined.



Personnel proceeding through NBC contaminated areas will avoid or reduce exposure to NBC agents by observing the following measures:

RADIOLOGICAL (NUCLEAR) CONTAMINATION

1 *Place sandbags on the floor of the vehicle to act as shielding material when traveling by vehicle, if time permits.*

2 *Cross where radiation is lower (check dose rate on markers), if possible.*

3 *Cross the area as quickly and safely as possible.*

CHEMICAL and BIOLOGICAL CONTAMINATION

1 *Wear your protective clothing to keep chemical and biological agents from entering your body.*

2 *Travel upwind of the contamination.*

3 *Avoid cellars, trenches, gullies, valleys, and other low places where agents may collect. Contaminants may also be on surfaces of buildings, debris, woods, shrubbery, tall grass, and puddles.*

4 *Avoid contaminated marked areas as much as possible.*

For additional information on NBC agents and warfare, consult FM 21-40, NBC Defense, and FM 21-41, Individual Defense NBC.



INDEX of STINGER TEC LESSONS

The following list contains TEC lessons that are applicable to Stinger personnel. These lessons have either been distributed to the field or are under various stages of development. Training and audiovisual support centers maintain complete lists of all TEC lessons, including additions or changes to Stinger TEC lessons.

920-061-0500-F	Introduction to TEC
920-777-0505-A	TEC for Green Tabbers
043-441-1015-F	TADDS Emplacement and March Order
043-441-1016-F	TADDS Operational Checks
043-441-1017-F	TADDS Operation
043-441-1018-F	TADDS Maintenance
043-441-XXXX-F	Introduction to the Stinger Weapon System
043-441-XXXX-F	Stinger Weapon System Operation
043-441-XXXX-F	Stinger Training Equipment; Description and Operation
044-441-XXXX-F	Stinger Weapon Security
044-441-XXXX-F	Infrared Background
044-441-XXXX-F	Stinger Technique of Fire
044-441-XXXX-F	IFF Interrogator
044-441-XXXX-F	Stinger Transportation and Handling
044-441-XXXX-F	Stinger Safety
044-441-XXXX-F	Stinger Maintenance
044-441-XXXX-F	Stinger Tactical Procedures
954-441-0047-F	Introduction to Aircraft Recognition
954-441-0049-F	Mirage III, F-104, MiG-27, A-10, AV-8
954-441-0050-F	OH-58, AH-1, Mi-6, Mi-4, UH-1
954-441-0051-F	MiG-21, Jaguar, Su-17/20, MRCA, Su-19
954-441-0052-F	Mi-24, Mi-8, C-130, AN-12, CH-47
954-441-0053-F	Su-7B, MiG-17, A-4, Il-28, G-91
954-441-0054-F	F-5, F-4, F-111, A-7, F-105
954-441-0056-F	F-15, F-14, OV-10, Alouette 111, Mirage F-1
954-441-0057-F	Gazelle, Scout, Puma, Lynx, BO-105
954-441-0058-F	Alpha Jet, F-16, OV-1, Buccaneer, A-6
954-441-0059-F	SAAB-105, SAAB-37, YAK-28, Lightning, Hunter
954-441-0065-F	Self-evaluation, Pt 1
954-441-0066-F	Self-evaluation, Pt 2



APPENDIX

REFERENCES

ARMY REGULATION (AR)

385-62	Regulations for Firing Guided Missiles and Heavy Rockets for Training, Target Practice and Combat

FIELD MANUALS (FM)

5-15	Field Fortifications
5-20	Camouflage
*7-7	The Mechanized Infantry Platoon and Squad
20-32	Mine/Countermine Operations at the Company Level
21-6	How to Prepare and Conduct Military Training
21-15	Care and Use of Individual Clothing and Equipment
21-40	NBC (Nuclear, Biological and Chemical) Defense
21-41	Individual Defense NBC
21-60	Visual Signals
24-18	Field Radio Techniques
24-20	Field Wire and Field Cable Techniques
24-24	Radio and Radar Reference Data
*44-1	US Army Air Defense Artillery Employment
(C)44-1A	US Army Air Defense Artillery Materiel (U)
44-6	Operations and Training Forward Area Alerting Radar (FAAR) and Target Alert Data Display Set (TADDS)
**44-16S	Soldier's Manual, ADA Stinger Crewman
*44-18	Stinger Platoon and Section Operations
44-102	Procedures for Ballistic Aerial Target System
*71-1	The Tank and Mechanized Infantry Company Team
105-5	Maneuver Control

* How-to-Fight Manuals

TRAINING CIRCULARS (TC)

5-200	Camouflage Pattern Painting
11-4	Handbook for AN/VRC-12 Series of Radio Sets
21-5-3	TEC Management Instruction
21-5-7	Training Management in Battalions
21-5-9	Battalion Training Extension Course Handbook
23-44	Small Arms Defense Against Air Attack
25-2	Training Ranges
44-30	Aircraft Recognition Training for Ground Observers

TECHNICAL MANUALS (TM)

5-1080-200-10	Operator's Manual: Camouflage Screen System Woodland Lightweight Radarscattering
**9-1425-429-12	Operator's and Organizational Maintenance Manual: (Stinger Air Defense Guided Missile System)
9-1430-589-12	Operator's and Organizational Maintenance Manual: Target Alert Data Display Set, AN/GSQ-137(XO-2) (Forward Area Alerting Radar System)
9-6920-427-10	Operator's Manual: Moving Target Simulator Trainer Device M87 (Stinger/Redeye Air Defense Guided Missile System)
**9-6920-429-12	Operator's and Organizational Maintenance Manual: Stinger Guided Missile Training Set
11-5820-401-12	Operator's and Organizational Maintenance Manual: (Including Repair Parts and Special Tools List): Radio Set AN/VRC-47
11-5820-498-12	Operator's and Organizational Maintenance Manual: Radio Set AN/GRC-160

TRADOC BULLETINS (TRADOC Bul)

6- Countersurveillance and Camouflage
9- Infantry Fighting Positions

ALLIED COMMUNICATIONS PUBLICATION (ACP)

124 Communications Instructions-Radiotelephone Procedures

NATO STANDARDIZATION AGREEMENTS (STANAG)

2047 Emergency Alarms of Hazard or Attack
3880 Counter-Air Operations

**To be published.



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20 OCTOBER 1980

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

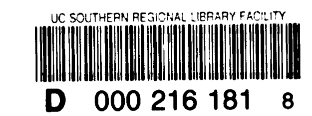
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STINGER TEAM OPERATIONS